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ST ANNUAL REPORT

OF THE

COMMISSION OF HEALTH

OF

MILWAUKEE.

(Twelfth Annual Report of the Department.)

JANUARY 1879.

MILWAUKEE:
EDWARD KEOGH, PRINTER TO THE CITY,
437 EAST WATER STREET,
1879.

With the compliments of

O. W. WIGHT, A. M., M. D.,

Commissioner of Health, Milwaukee.

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FIRST ANNUAL REPORT

OF THE

COMMISSION er. OF HEALTH

OF

MILWAUKEE. Health dept.

(Twelfth Annual Report of the Department.)

JANUARY, 1879.

MILWAUKEE:
EDWARD KEOGH, PRINTER TO THE CITY,
437 EAST WATER STREET,
1879.

Exch.
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Western Ontario

MEMBERS OF THE HEALTH DEPARTMENT.

O. W. Wight, M. D.,	Commissioner of Health.
E. H. G. Meachem, M. D.,	Assistant Commissioner.
A. F. Kalckhoff, M. D.,	Assistant Commissioner.
E. W. Diergks,	Secretary.
E. W. Tallmadge,	Inspector.
G. Kaeppel,	Meat Inspector.

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GENERAL REPORT OF THE COMMISSIONER.

OFFICE OF THE COMMISSIONER OF HEALTH,
JANUARY, 1879.

To the Honorable the Mayor and Common Council of the City of Milwaukee:

The Commissioner of Health herewith respectfully presents his first Annual Report, the same being the Twelfth Annual Report of the Health Department of Milwaukee.

OBJECT OF THE REPORT.

My aim in this Report is to give the members of the municipal government and the people of Milwaukee information in regard to the means of preserving the public health, and not to make an original contribution to Sanitary Science. As Dr. Parkes, a great Hygienic authority, truly says, "It has been proved over and over again that nothing is so costly in all ways as disease, and that nothing is so remunerative as the outlay which augments health, and in doing so, augments the amount and value of the work done." Playfair, whose statistics are of great value, tells us that there are twenty-eight cases of sickness for every death. Let us reduce the estimate to a minimum of twenty. At a low calculation, each case of sickness represents a loss of fifty dollars to the State, or to the community taken as a whole. Every unnecessary death, therefore, indicates a public loss of one thousand dollars. Dr. W. E. Boardman, in a careful and elaborate paper contributed to the Sixth Annual Report of the State Board of Health of Massachusetts, demonstrates that the yearly loss to that commonwealth by preventable sickness is considerably more than three millions of dollars. If the people of Wisconsin were properly instructed in Sanitary Science, were alive to hygienic facts, it would be possible to carry out measures that might reduce disease to an extent representing a saving, every year, to the State of a sum at least equal to the interest at six per cent. on fifty millions. Every dollar wisely expended for the preservation of the public health is returned ten fold, sometimes a hundred fold, to the community. "It is," says Dr. Farr, "as certain that a high mortality can be reduced, by hygienic appliances, down to a certain limit, as it is that human life can be sacrificed." And above all material saving, is the far higher consideration, the diviner economy, of human suffering and anguish. "The hope," again says Dr. Farr, "of saving any number of human lives by hygienic appliances, is enough to fire the ambition of every good man who believes in human progress."

The preservation of the public health, until nearly the middle of our century, has been a lost art among Christian nations. The old Greek, Hippocrates, summed it up in his hygienic formula, "Pure air, pure water, and a pure soil."

THE PEOPLE AND THE PRESS SUSTAIN THE HEALTH DEPARTMENT.

No nuisance can withstand educated public opinion and the daylight of the press. Things that are dangerous to health and life require the covering of ignorance and darkness. Here, as well as elsewhere, the people are in advance of legislators, so far as sanitary measures are concerned. What Dr. Elisha Harris, of New York, says, in a communication to Dr. Bowditch, of the citizens of the great commercial metropolis of the country, is equally true of the citizens of Milwaukee: "The people generally sustain the public health measures." He further says: "The courts of appeal have, in every case, sustained the Sanitary Code." I am very happy to state that the Health Department here, during my administration, has been sustained by an enlightened Municipal Court, and it has not been necessary in a single case to take an appeal to a higher tribunal. As to the willingness of the public to sustain health measures, Dr. Harris relates that, "The merchants of the city, in 1864-65, when fevers and small-pox threatened the wellfare of commerce and of human life, and even jeopardized the national cause, provided for a voluntary inspection, survey and report, by a volunteer Council of Hygiene. When there was no Board of Health, that work, by the Citizens' Council of Hygiene, was organized and conducted by fifty expert medical men; and the two editions of the volume of reports, with the charts, maps, and special labors, cost $18,000, and became the *raison d'etre* of the Metropolitan Sanitary Code. Thus, wealth and intellect gave origin to the present sanitary system." I have no doubt that the people of Milwaukee would do likewise under similar circumstances. And the press, forgetting personal differences, takes an enlightened view of the public interest and gives its powerful influence in aid of measures to improve the salubrity of our city.

LAWS REGUTATING THE HEALTH DEPARTMENT.

The chapter of this report, under the above title, contains the Legislative Act creating the office of Commissioner of Health, the provisions of the City Charter, establishing a Health Department, the various Ordinances having sanitary measures in view, the principles of the Common Law that govern courts in the administration of health enactments, and such sections of the Revised Statutes of the State as my department of the city government must recognize and enforce. In this collection of sanitary laws, I have omitted all sections and parts of sections that have been repealed by successive enactments, and have inserted amendments at the proper places, so as to exhibit the Sanitary Code of Milwaukee just as it now exists. It has been a work of some difficulty, requiring especial care. Many of the health ordinances here appear for the first time in a printed form convenient for reference and public use. In fact, the changes in these ordinances have been so great, that hitherto it has been impossible, without especial study, to know which were, and which were not, in force. As there must in the near future be a new revision of the Ordinances, the municipal government will find the work already done so far as the portion governing the Health Department is concerned. The saving in the cost of revision will be more than enough to defray the expense of printing this portion of my report.

As courts are less familiar with the legal principles applicable to the adjudication of sanitary enactments, than with some other departments of the law, I make no apology for transferring to this report several sections from an able commentator, on the subjects of Protection to the Public Health, Offensive Trades, the general doctrine of Nuisance, etc., with ample reference to carefully selected cases.

LATENT POWER OF THE COMMON COUNCIL.

The legislative branch of the municipal government not only has ample authority in the Charter for such Health Ordinances, as have hitherto been passed, but it also has power to enact many more, in order to extend the public authority over several things that have thus far escaped supervision. It may be well enough to bring together here scattered provisions of the Charter, whereby such power to pass sanitary ordinances is conferred.

Section 3, chapter IV of the Charter, provides that, * * * "the Common Council shall have authority—anything in a general law of this state to the contrary notwithstanding—by ordinances, resolutions, by-laws, rules or regulations," among other things:

"6. To compel the owner or occupant of any grocery, cellar, tallow chandler's shop, soap factory, tannery, stable, barn, privy, sewer or other unwholesome nauseous house or place, to cleanse, remove or abate the same, from time to time, as often as it may be deemed necessary for the health, comfort and convenience of the inhabitants of said city."

"7. To direct the location and management of, and regulate breweries, tanneries and packing houses; and to direct the location, management and construction of, and regulate, license, restrain, abate or prohibit, within the city and the distance of four miles therefrom, distilleries, slaughtering establishments, establishments for steaming or rendering lard, tallow, offal, and such other substances as can or may be rendered, and all establishments or places where any nauseous, offensive or unwholesome business may be carried on; *provided*, that for the purpose of this section, the Milwaukee, Menomonee and Kinnickinnic rivers, with their branches, to the outer limits of the county of Milwaukee, and all canals connected with said rivers, together with the land adjacent to said rivers and canals, or within one hundred rods thereof, shall be deemed to be within the jurisdiction of the city."

"9. To regulate butchers, and to regulate and restrain the sale of game, poultry, fresh meat, vegetables, fish, butter, fruit, eggs, and other provisions in the city; to restrain and punish the forestalling of poultry, fruit and eggs; and to cause the seizure and destruction, or other disposition, of tainted or unwholesome meat, butter, vegetables, fruit or provisions."

"22. To regulate, control and prevent the landing of persons from boats or vessels wherein are contagious or infectious diseases or disorders, and to make such disposition of such persons as to preserve the health of said city; and also to make regulations to prevent the introduction of contagious diseases into the city, or their spread therein; and to make quarantine laws or regulations, and enforce the same within the city and not to exceed five miles beyond the city bounds."

"23. To abate all nuisances which are or may be injurious to the public health, in any manner they may deem expedient; and to do all acts and make all regulations which may be necessary or expedient for the preservation of health and the suppression of disease."

"24. To regulate the burial of the dead and registration of births and deaths; to provide hospital and cemetery grounds; to direct the returning and keeping of bills of mortality; and to impose penalties on physicians, sextons and others, for any default in the premises."

"25. To abate and remove all nuisances under the ordinances or at common law, and punish the authors thereof by penalties, fine and imprisonment; and to define and declare what shall be deemed nuisances, and authorize and direct the summary abatement thereof; but nothing in this act shall be so construed as to oust any court of its jurisdiction to abate and remove nuisances in the streets, or any other parts of said city, or within its jurisdiction, by indictment or otherwise."

"26. To prevent any person from bringing, depositing or having within the limits of said city, any putrid carcass or other unwholesome substance; and to require the removal or destruction of the same by any person who shall have upon or near his premises any such substances or any putrid or unsound beef, pork, fish, hides or skin of any kind; and, on his default, to authorize the removal or destruction thereof by some officer or officers of the city, at the expense of such person or persons."

"27. To erect or establish one or more pest houses, hospitals and dispensaries, and control and regulate the same."

"36. To regulate the sale of bread within said city, and prescribe the assize and weight of bread in the loaf, and the quality of the same; and to provide for the seizure and forfeiture of bread baked contrary to such regulations and prescriptions."

"38. . . . . . To regulate the cutting and sale of ice and to restrain the sale of such ice as is impure. . . . . ."

"43. To regulate the places and manner of selling pickled and other fish."

SEWERS, SEWAGE AND SEWER-GAS.

In the somewhat lengthy chapter on this subject I have endeavored to point out to the people of Milwaukee sources of great danger to the public health. It is not necessary to recapitulate here either the facts on which the discussion is based or the conclusions reached. Sufficient details have been given to make the matter clear to those who have not made a special study of sanitary science. The highest hygienic authorities have been cited, in order that citizens may have other reasons for their conclusions than the unsupported declarations of the Health Commissioner. Remedies for acknowledged evils have been suggested, but the best method of relieving the rivers from the influx of town sewage has been left an open question. I have deemed it sufficient to direct public attention to the great nuisance in the most emphatic manner, fully expecting that the engineer department of the municipal government will devise some practical means of remedying the evil. The magnitude of the expenditure that will be required naturally admonishes to prudence and the desired end will doubtless be soonest reached by "making haste slowly." In the long run, the most economic process will be to adopt the best method, at whatever cost. No graver duty rests upon the Common Council than to dispose of this matter wisely. I have endeavored to do my part faithfully, without encroaching upon the functions of other departments of the city government.

THE WATER SUPPLY OF MILWAUKEE.

This is intimately connected with the preceding subject; in fact, may be regarded as a continuation of it. I make no apology for discussing it at length, since pure water is quite as necessary for maintaining the public health as wholesome food. Individuals can shift for themselves in procuring food, but good water can be obtained only by the joint action of the whole community as an organized body. The water supply of a city is, therefore, a subject requiring the intelligent attention of public authorities. I have pointed out the great danger of using the wells in the city. Whether the source of suppy in the lake is polluted by the great quantity of sewage and other organic matter poured into it by the befouled rivers, has been carefully discussed and such facts and considerations presented as —it is to be hoped—will lead to more conclusive investigations. The realm of organized matter, as well as the realm of organic matter, has been opened to view and dangers indicated that can be fully revealed only by trained and scientific microscopists. It would perhaps be prudent to take the peril for granted and to make some expedient, if not necessary, changes in the disposal of sewage or in the location of pumping, considering the unpleasant, if not dangerous, proximity of the egress of putrefying excrement and the ingress of our drinking water. Again, I have laboriously done my part in fully presenting the subject under all its sanitary aspects.

SANITATION OF PUBLIC SCHOOLS.

There are presented, in the chapter under the above title, not only the results of a personal examination of the school buildings, but also a summary of the views and special experience of the principals of the schools, given in response to formal questions, on the important topics of site, ventilation, drainage, heating, space, privies, contagious diseases, light, etc. The healthy or unhealthy condition of the structures in which the children of the city are educated at the public expense, is a matter that touches all hearts. Nothing is of more vital interest to the people. In view of Franklin's wise and pithy saying, "public health is a nation's wealth," the sanitary condition of the places where the rising generation, the future citizens, are educated, demands the enlightened attention of law-makers and political economists, as well as the co-operation of educators and philanthropists.

THE MEAT SUPPLY OF MILWAUKEE.

Under this title I have discussed at considerable length the nuisance of promiscuous slaughtering and rendering in the city, the important subject of a public abattoir, the utility of a union stockyard, the prevention of cruelty to animals, and the sanitary need of a regular system of inspecting animals designed for human food.

An attentive perusal of the chapter will, I think, convince any one that the disagreeable odors from rendering establishments and packing houses are not a necessity incidental to the business, but the result of negligence, and might be obviated by care, knowledge of organic gasses, and a moderate outlay. When citizens come to understand the facts, they will not be inclined to tolerate the nuisance thereafter. The proprietors of such places, however, are reasonable men; they have already made improvements and promise more in the future.

SUBJECTS BRIEFLY DISCUSSED.

Yellow fever, scarlatina, diphtheria, physicians, undertakers, the new city hospital, the house of correction, the county buildings, ice, nuisance court, street sweepings, garbage, mid-wives, privy vaults, adulterations of food and drink, the metric system, nomenclature of the causes of death, and a detailed financial statement, are topics which are treated in this division of the report as fully as their relation to immediate public interest demands, or an explanation of my work requires. It has seemed to me best to render to the executive and legislative branches of the municipal government, and through them to the people, a full account of all proceedings in this department. Measures for the protection of the public health can be carried out only so far as the public receives instruction in sanitary matters and is thus prepared to give intelligent and willing cooperation. Mankind are reasonable and like to know why they are required to do certain things, even for their own good. Health enactments sometimes, from the very nature of the evils they are designed to remedy, appear to be arbitrary and need rational explanation. Individuals cannot live according to hygienic rules, unless the community around them are required to observe certain sanitary regulations demanded by the general good. "For example," to use the wise and conservative language of Dr. Parkes," pure air is a necessity for health; but an individual may have little control over the air which surrounds him, and which he must draw into his lungs. He may be powerless to prevent other persons from contaminating his air, and thereby striking at the very foundation of his health and happiness. Here, as in so many other cases which demand regulation of the conduct of individuals towards each other, the state steps in for the protection of its citizens, and enacts rules which shall be binding upon all. Hence arises what is now termed 'State Medicine,' a matter of the greatest importance. The fact of State Medicine being possible, marks an epoch in which some sanitary rules receive a general consent, and indicates an advancing civilization. Fear has been expressed lest State Medicine should press too much on the individual, and should too much lessen the freedom of personal action. This, however, is not likely, as long as the State acts cautiously, and only on well-assured scientific grounds, and as long as an unshackled Press discusses with freedom every step."

VITAL STATISTICS.

The usual mortuary and meteorological tables close the report. A careful study and thoughtful analysis of these tables would lead to many important deductions. They are not as full and instructive as they might be made, if the department had a registrar of vital statistics who could give his whole attention to the subject. The mortuary tables are constructed to show results rather than processes, but they are far from being complete. I hope to establish them on a scientific basis, with fuller developments, hereafter. The secretary of the office has bestowed much labor on them and that they are less defective than before is due to him.

A CITY MAP OF CONTAGIOUS DISEASES.

The map of Milwaukee, accompanying this report, exhibits to the eye, in different colored spots, the location of every case of scarlet fever, diptheria or small-pox that occurred in the city during the year 1878. The sewer system and water system are traced on the map in distinct colors. Heavy, dotted, contour lines, with the elevations distinctly marked in bright colors, divide the city into irregular regions according to altitude. The three leading contagious diseases, by aid of this map, can be easily studied with refence to sewers, water distribution, and height above the level of the lake.

WORK TO BE DONE.

In addition to the routine labor of the department, many matters of great public importance require attention in the future. More than three hundred thousand dollars worth of milk is sold to the people of the city every year. A depreciation of its quality by skimming or watering, to the extent of only ten per cent., amounts to a loss of more than thirty thousand dollars a year to the citizens. The carelessness, ignorance, or uncleanliness, of some of the producers, makes it here and there a source of danger, especially to children. This department needs a milk inspector, experienced in the business, who can use the lactometer and make a simple chemical analysis. More than ten thousand tons of human ordure lies putrefying in vaults, poisoning air, earth, and water, and adding to the list of mortality, which should be removed. The sewer system is defective and needs important changes. Those who manufacture bread, pastry, candy, etc., should be brought under supervision of the Health office through a special skilled inspector. Thousands of houses, poisoned with sewer-gas, should be rendered wholesome by changes that can be effected rather by sanitary teaching and persuasion than by the enactment and enforcement of law. I shall strive towards the accomplishment of these and other things, always endeavoring to accompany the execution of regulations with sanitary instruction; and in this latter respect, I implore the press, not for my sake, but for the sake of the public health and prosperity, to lend its powerful aid.

Respectfully submitted,
O. W. WIGHT, M. D.,
Commissioner of Health.

LAWS REGULATING

THE

HEALTH DEPARTMENT

OF THE

CITY OF MILWAUKEE.

"The public health, the wellfare, and safety of the community, are matters of paramount importance, to which all the pursuits, occupations, and employments of individuals, inconsistent with their preservation must yield."—COMMONWEALTH VS. UPTON, 6 GRAY, 473, OPINION BY MERRICK, J.

LAWS REGULATING HEALTH DEPARTMENT.

The office of Commissioner of Health of Milwaukee, was created by chapter 36, local laws of 1878. It reads as follows:

I.—AN ACT

RELATING TO THE HEALTH DEPARTMENT OF THE CITY OF MILWAUKEE.

The people of the State of Wisconsin, represented in Senate and Assembly, do enact as follows:

Commissioner of Health.

SECTION 1. It shall be the duty of the Mayor of the city of Milwaukee to appoint on the third Tuesday of April, 1878, and biennially thereafter, subject to confirmation by the Common Council of said city, a Commissioner of Health, whose duty it shall be to examine into and consider all measures necessary to the preservation of the public health in said city, and to see that all ordinances and regulations in relation thereto be observed and enforced.

Oath and Salary.

SEC. 2. Such Commissioner shall, before he enters upon the duties of his office, take and subscribe the usual oath of office, and shall receive for his services such salary as the Common Council of said city by ordinance fix and determine.

Vacancy.

SEC. 3. Any vacancy in the office of Commissioner of Health shall be filled by appointment of the Mayor with the approval of said Council. Such appointment to be for the unexpired term.

Commissioner makes all appointments in his office.

SEC. 4. The Commissioner of Health shall have power to appoint, subject to confirmation by said Common Council, such assistants, clerks, agents and workmen, as may be necessary for the proper discharge of his duties, and they shall receive such salary or compensation for their services as said Common Council may fix.

Supercedes B'rd of Health.

SEC. 5. All powers vested in the Board of Health and the health officer of said city are hereby conferred upon the Commissioner of Health, and all the duties of said board and of said Health Officer shall, from and after the taking effect of this act, devolve upon and be vested in the said Commissioner of Health.

Repealing Clause.

SEC. 6. Sections one, two and three of sub-chapter XIII of chapter 184, of the laws of 1874, entitled, "An act to revise, consolidate and amend the charter of the city of Milwaukee, approved February 20, 1852, and the several acts amendatory thereof, also chapter 69 of the laws of 1876, amendatory of said chapter 184, and all other acts and parts of acts contravening the provisions of this act, are hereby repealed."

SEC. 7. This act shall take effect on the 15th day of April, A. D., 1878.

Approved February 23, 1878.

II.—MILWAUKEE CITY CHARTER.

Chapter XIII of Milwaukee City Charter, creating and regulating a Board of Health, reads, with the changes and omissions made by the preceding act, as follows:

Powers of Commissioner of Health.

SECTION 4. The Commissioner of Health, or any person acting under his orders, shall have authority to enter into and examine, at any time, all buildings, lots, and places of all descriptions within the city, for the purpose of ascertaining the condition thereof so far as the public health may be affected thereby.

Duties of the Commissioner of Health.

Penalty for disregarding order of Commissioner.

SEC. 5. The Commissioner of Health shall give all such directions, and adopt all such measures, for cleansing and purifying all such buildings, lots and other places, and for causing the removal therefrom of all nauseous substances producing a disagreeable smell, or tending to cause sickness or disease, as in his opinion shall be deemed necessary; and he may do or cause to be done whatever in his judgment shall be needful to carry out such measures. Every person who shall disobey any order of the Commissioner of Health which shall have been personally served upon him, requiring him to abate or remove any nuisance, or to cleanse or to purify any premises owned or occupied by him, in the manner or at the time described in the order, shall, on complaint of the Commissioner of Health, or of any person serving such order, before the

Municipal Court of said city, be liable to arrest and summary trial; and punishment by fine not exceeding five hundred dollars, or by imprisonment not exceeding six months, or by both such fine and imprisonment in the discretion of the court.

Commissioner may abate nuisance at expense of city.

Cost thereof shall remain a lien on prmises.

Comptr'll'r shall include such sums in schedule of special taxes, and enforce collection.

SEC. 6. It shall be lawful for the Commissioner of Health, in all cases where he may deem it necessary for the more speedy execution of his orders, to cause any such nuisance or nuisances, to be abated or removed at the expense of the city, and also to cause any such nuisance or nuisances, which may exist upon the property of non-resident owners, or upon property, the owners of which cannot be found, or are unknown and cannot be ascertained, to be abated or removed in like manner, at the expense of the city, and the sum or sums so expended in the abatement or removal of such nuisance or nuisances, in such cases, shall be a lien, in the same manner as any tax upon real estate, upon the lots or premises from or upon which such nuisances shall be abated or removed; the Commissioner of Health, shall certify to the Comptroller the description of such property, and the cost of abating and removing such nuisance or nuisances thereon, and the Comptroller shall include the same in his annual schedule of lots subject to special taxation; and payment thereof may be enforced in like manner as other special taxes upon real estate are levied and collected in said city: ***provided***, that the Common Council shall, from time to time, on application of said Commissioner of Health, appropriate and set apart out of the general fund of said city, such sums as the Council, in its discretion, shall deem necessary for the purposes of this chapter; and the expenses which the said Commissioner is authorized by this section to incur, shall be paid exclusively out of the funds so provided by said city; and said Commissioner shall not be authorized to create any liability on the part of said city in excess of the sums which shall have been appropriated and set apart as aforesaid for his use.

Commissioner may order clothing or infectious substances destroyed.

SEC. 7. It shall be the duty of the Commissioner of Health, to direct any bedding, clothing, putrid or unsound beef, pork, fish, hides or skins of any kind, or any other articles found within said city, which in his opinion, will be dangerous to the health of the inhabitants thereof, to be destroyed or buried, and he may employ such persons as he deems proper to remove or destroy such articles, and every person who shall in any manner resist or hinder any person so employed, shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be punished by a fine not exceeding two hundred and fifty dollars, or imprisonment not exceeding six months, or both. It shall also be his duty to procure suitable places for the reception of persons sick of any pestilential or infectious disease, and in all cases where sick persons cannot otherwise be provided for, to procure for them proper medical and other attendance and provisions, and to forbid and prevent all communication with any house or family infected with any contagious or pestilential disease, except by means of physicians and nurses.

Commissioner shall provide pest houses.

May suppress any business detrimental to health.

SEC. 8. It shall be the duty of the Commissioner of Health on complaint being made to him, or whenever he shall deem any business, trade or profession carried on by any person or persons, or corporation, in the city of Milwaukee, detrimental to the public health, to notify such person or persons, or corporation, to show cause before the Commissioner of Health, at a time and place specified in such notice, why such business, trade or profession, should not be discontinued or removed, which notice shall not be less than three days (except that in cases of epidemic or pestilence, the Commissioner of Health may, by general order, direct a shorter time, not less than twenty-four hours), and may be served by leaving the same at the place of business or residence of the parties to be affected thereby.

Cause for suppression may be shown by affidavit.

Cause may be shown by affidavit, and if, in the opinion of the Commissioner of Health, no good and sufficient cause be shown why such business, trade or profession, should not be discontinued or removed, the Commissioner shall order the said parties to discontinue or remove the same within such time as the Commissioner may deem reasonable and necessary, and the order of the Commissioner shall be final and conclusive.

Penalty for failing or refusing to obey order of Commissioner.

SEC. 9. Any person or persons failing or refusing to obey such lawful order of the Commissioner of Health, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than two hundred and fifty dollars or by imprisonment not more than one year, or by both such fine and imprisonment; and such person or persons shall be subject to like punishment for each and every day that he, she, or they, shall continue such business, trade or profession, after the expiration of the time specified in the order of the Commissioner of Health, for the discontinuance or removal of the same.

Ex-parte affidavit sufficient in trials.

SEC. 10. In all trials for violation of the provisions of this chapter, the *ex-parte* affidavit of service of any order, notice or requirement of the said Commissioner of Health, purporting to be made by the person who made such service, and stating the time, place and manner of the service, shall be deemed and taken as *prima facie* evidence of the due service of such order, notice or requirement, in all trials in any court.

SEC. 11. All fines mentioned in this chapter shall be collected as other fines, and when so collected, shall be paid into the City Treasury.

Fines.

SEC. 12. The Commissioner of Health, during the prevalence of Asiatic cholera, or of any epidemic disease, shall have power, when by him it is deemed necessary, to take possession of, and occupy as temporary hospitals, any building or buildings in the said city; but the city of Milwaukee shall pay for the use of such property, so taken, a just compensation.

Temporary hospitals.

SEC. 13. It shall be the duty of each and every practicing physician in the city of Milwaukee:

Practical physicians shall report number of patients attacked with pestilential disease.

1. Whenever required by the Commissioner of Health of said city to report to said Commissioner, at such times and in such forms as he may prescribe, the number of persons attacked with any pestilential, contagious or infectious disease, attended by such physician, for the twenty-four hours next preceding, and the number of persons attended by such physician who shall have died within the twenty-four hours next preceding such report, of any such pestilential, contagious or infectious disease;

2. To report in writing to said Commissioner of Health, every patient he shall have laboring under any pestilential, contagious or infectious disease, within twenty-four hours after he shall ascertain or suspect the nature of such disease;

Number still under treatment.

3. To report in writing to the Commissioner of Health, when by him required, the death of any patient who shall have died of any disease, within twenty-four hours thereafter, and to state in such report the specific nature and type of such disease.

Report all d'ths within twenty-four hours.

SEC. 14. Any practicing physician who shall neglect or refuse to perform the duties required of him by or in any section of this chapter, shall be considered

Penalty for neglect.

guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than two hundred and fifty dollars for each offense.

Estimates for salaries and expense of Commissioner of Health.

SEC. 15. The Common Council of said city shall, in making their annual estimates and levy for the expenses of the city government, estimate and provide such sums as may be necessary for the compensation of such officer and all other employes which the said Commissioner of Health is authorized to appoint, and for all other necessary expenses incurred by said Commissioner in the performance of the duties prescribed in this chapter; and such expenses shall be audited and allowed and paid as other expenses of said city.

Council may further define duties of Commissioner.

SEC. 16. The Common Council of the City of Milwaukee shall have power to further define the duties of the Commissioner of Health, and to pass such ordinances in aid of the powers of the Commissioner of Health as may tend to promote and secure the general health of the inhabitants of said city.

Police and other civil officers to aid Commissioner of Health.

SEC. 17. It shall be the special duty of the members of the police force of said city, and of all magistrates and civil officers and all citizens of the state to aid to the utmost of their power, the Commissioner of Health and the officers mentioned in this chapter, in the performance of their respective duties, and on requisition of the Commissioner, it shall be the duty of the Chief of Police to detail one or more of the policemen of said city to serve the notices of said Commissioner, and to perform such other duties as such Commissioner may require.

III. HEALTH ORDINANCES.

Chapter XII of the revised, consolidated and amended General Ordinances of the City of Milwaukee, passed April 20, 1875, pertaining to the subject of Health, has been greatly modified by subsequent Ordinances. The sections that have been repealed are here omitted and in their place are inserted the new Ordinances that are now in force. Ordinances that contain no especial repealing section are given in the order of their passage.

Forbids throwing filth and nauseous substances on streets, &c.

SECTION 1. No person shall place, throw or leave, or suffer his wife, child or servant, or any other person living or being in his or her house or premises, to place, throw or leave any slops, dirty water, or other liquid of offensive smell or otherwise nauseous or unwholesome, or any dead carcass, carrion, meat, fish, entrails or other nauseous or unwholesome substance or matter, or any dirt, filth, straw or other rubbish, or any ashes, garbage, rubbish, dirt or refuse of any kind or description, in or upon any street, gutter, sidewalk, alley or public ground, in the city of Milwaukee.

Forbids discharge of offensive liquids in street, gutter, &c.

SEC. 2. No person shall suffer any slops, dirty water or other liquid of offensive smell, or otherwise nauseous or unwholesome, or any fluid substance of offensive smell or otherwise nauseous or unwholesome, to flow from his or her house or premises into or upon any street, gutter, sidewalk, alley or public ground in the city of Milwaukee, nor shall any person place, throw or leave any nauseous, offensive or unwholesome matter or substance in or upon any lot or lands in said city.

Penalty.

SEC. 3. Any person violating either of the foregoing sections of this chapter shall, on conviction thereof, be fined a sum not less than three nor more than twenty-five dollars for each violation thereof.

Nauseous substances and filth not to remain.

SEC. 4. No owner or occupant of any tenement or lot in this city shall permit any substance mentioned in the first section of this chapter to be or remain in said tenement or lot, or between the same and the center of the street adjoining, under the penalty of three dollars for each and every twenty-four hours during which the same shall remain or be thereon.

Police department to examine and enforce cleanliness.

SEC. 5. It is hereby made the duty of the Chief of the Police Department to cause such necessary examinations to be made from time to time as may be required to keep the streets, alleys, sidewalks and public grounds free from the nauseous substances mentioned in this chapter, and to institute prosecutions against all persons who may violate the same.

Premises injurious to health.

SEC. 6. Any owner or occupant of any house or place, who shall suffer the same to become nauseous or injurious to the health of the inhabitants of this city, shall forfeit the penalty of five dollars for each and every offense.

Mayor may order cleaning.

SEC. 7. It shall be lawful for the Mayor, any alderman of the proper ward, the Commissioner of Health, or any policeman, to order the owner or occupant of any house or place to cleanse, remove or abate the same, as often as may be necessary for the health, comfort and convenience of the inhabitants of this city, and any person refusing or neglecting to obey such order shall forfeit the penalty of five dollars for every twenty-four hours he shall neglect or refuse.

Contents of v'lts—when removed

SEC. 8. No tub or other vessel containing the contents of any vault, privy or necessary house within the limits of the city, shall be removed therefrom, except between the hours of eleven o'clock at night and four in the morning, under the penalty of not less than two nor more than ten dollars, and then only in compliance with the provisions of this chapter.

Dead animals, &c, on lake bluffs.

SEC. 9. No drayman, cartman or other person shall throw, place or leave any dead animal, carrion, offal or other offensive matter on the lake bluff or bank, or in the Milwaukee harbor, or in any river or bayou within the limits of this city, under a penalty of not less than two nor more than twenty-five dollars for each and every offense.

Sections 10, 11 and 12 were repealed by the following

ORDINANCE,

To provide for the removal of garbage from the city of Milwaukee:

The Mayor and Common Council of the City of Milwaukee do ordain as follows:

Commissioner of Health to make rules.

SECTION 1. The Commissioner of Health of the city of Milwaukee is hereby authorized and required to prepare and keep on file in his office a set of rules and regulations for the removal of garbage from the city of Milwaukee.

Contract for removal of garbage.

SEC. 2. The Commissioner of Health is hereby authorized and directed to advertise in the official papers of the city of Milwaukee, for sealed proposals for the collection and removal from the city, of all garbage, offal and dead animals, to be done according to said rules and regulations on file. Such proposals shall be opened by the Commissioner of Health at the time and place designated for that purpose, in his said advertisement, and a contract for the collection and removal from the city of all garbage and offal according to said rules and regulations, shall be made with the lowest responsible bidder. Provided that if all the bids are unreasonably high, the said Commissioner may reject them all for that reason, and proceed to advertise anew for sealed proposals, and continue to do so until a reasonable bid shall be made. And provided further, that no contract shall be entered into by the Health Commissioner, without authority of the Common Council.

Contractor to give bond with two sureties in penai sum of $5,000.

SEC. 3. Every contract made pursuant to this ordinance shall be signed by the contractor, and by the Commissioner of Health on behalf of the city of Milwaukee, and countersigned by the Comptroller, and shall provide for the collection and removal from the city, of all garbage, offal, and dead animals, according to said rules and regulations, every day from the 20th day of April to the 20th day of October, and at least twice a week during the residue of the year. The term of each such contract shall be one year from the date thereof. Every such contract shall be accompanied by the bond of the contractor, with at least two sufficient sureties in the penal sum of five thousand dollars, conditioned for the faithful performance by the contractor of the terms and conditions of the contracts on his part. Each such bond shall be approved by the City Attorney as to its form and execution, and by the Comptroller as to the sufficiency of the sureties.

Contractor paid monthly from general fund.

SEC. 4. The contractor for the collection and removal of garbage and offal under this ordinance shall be paid monthly, from the general fund of the city of Milwaukee, the amount stipulated in his contract, the same as city officers' salaries are paid; and a sum sufficient for that purpose is hereby annually appropriated from said fund.

Repealing sections 10, 11 and 12.

SEC. 5. Sections 10, 11 and 12, of chapter 12, of an ordinance passed April 20, 1875, entitled "An ordinance to revise, consolidate and amend the general ordinances of the city of Milwaukee" are hereby repealed, and sections 13, 14, 15, 16, 17, 18, 19 and 20, of said chapter, are hereby made applicable to the collection and removal of garbage and offal under this ordinance instead of said repealed sections.

SEC. 6. This ordinance shall take effect and be in force from and after its passage and publication.

Passed September 2d, 1878.

THE RULES,

authorized and required by the above ordinance, have the force of law, and are as follows:

Contract was let for one year from October 1, 1878, for $3,120.

1. Collectors of garbage, offal and dead animals, must drive through the alleys, where alleys exist and are passable.

2. All garbage, offal and dead animals must be removed beyond the city limits.

3. All tubs, boxes, barrels, etc., used for collecting garbage, offal and dead animals, must be water-tight, so as to prevent any dripping; they must also be covered, and washed every time they are used.

4. Collectors of garbage, etc., must not throw away slop, oyster cans, broken crockery, or like things in the alleys, on the streets, vacant lots, or other places within the city limits.

5. Employes of the garbage contractor, when on duty, must be civil and accommodating to the people, must not make unnecessary noise, nor become intoxicated.

6. Employes of the garbage contractor must deliver, free of charge, any circular from the Health Department, giving the people information in regard to the collection of garbage.

7. Garbage collectors must carry a copy of these rules, which they must show to any citizen on reasonable demand.

8. Garbage, etc., must be collected from every house in the city, every day, from April 20th to October 20th.

9. From the 20th of October to the 20th of April, garbage, etc., must be collected from every house on the West Side, Mondays and Thursdays; on the East Side, Tuesdays and Fridays; on the South Side, Wednesdays and Saturdays.

10. Garbage collectors will signalize their coming by blowing a horn, or by such other means as the Commissioner of Health may, from time to time, direct.

11. Any vialation of these rules will subject the contractor to a fine of not less than one dollar, and not more than five dollars, in addition to his liabilities under his contract, at the discretion of the Commissioner of Health, such fine to be deducted from his pay, for the benefit of the city. The contractor and his employes will also be subject to the penalties imposed by ordinances for vjolation thereof.

12. The contractor must report every day to the Commissioner of Health at his office, and make monthly statements, in writing, of the amount of garbage and number of dead animals removed.

HEALTH ORDINANCES.

Garbage Carts.

SEC. 13. The garbage and offal shall be removed beyond the city limits such distance as the Commissioner of Health may deem best for the health of the city. All garbage and offal shall be collected in close carts, and each cart shall be purified as often as the Commissioner of Health may direct, and shall have painted thereon the words "Garbage cart."

Vessels for keeping garbage.

SEC. 14. Housekeepers shall put their garbage and offal in water-tight vessels, the capacity of which shall not exceed one bushel, and said vessel shall be placed at a point on the premises most accessible to the person collecting the garbage and offal, and it shall be the duty of such person to see that nothing but refuse animal and vegetable matter be put in the vessel used for garbage and offal.

SEC. 15. Each person having charge of a garbage and offal cart shall carry a horn, which shall be sounded at each corner, and in the middle of each block, to give warning of his approach. **Contractor to sound horn.**

SEC. 16. No person shall engage in collecting or removing garbage and offal within the city, except under a contract, as provided in this chapter, and it shall be unlawful for any person to interfere in any manner with the collection and removal of garbage and offal by the person or persons authorized so to do. **Contractor not to be interfered with.**

SEC. 17. All complaints against the persons collecting garbage and offal, or against householders, shall be made to the Commissioner of Health of the city. **Complaints.**

SEC. 18. It is hereby made the special duty of the persons collecting garbage and offal, and of the police of said city, to aid the Commissioner of Health in carrying out the provisions of this chapter. **Aid to Commissioner of Health**

SEC. 19. The Commissioner of Health may prescribe rules and regulations, not inconsistent with the provisions of this chapter, to govern the time and manner of collecting such garbage and offal. **Rules and Regulations.**

SEC. 20. Any person found guilty of violating any of the provisions of the last preceding ten sections of this chapter, or either of them, shall be punished by a fine not less than five dollars nor more than twenty dollars. **Penalty.**

BREAD.

SEC. 21. All bread manufactured by the bakers of this city shall be made of good and wholesome flour or meal, and any person who shall sell or offer for sale in this city any bread or cake made of poor or unwhole- **Bread.**

some flour or meal, shall be punished by a fine of ten dollars for each and every offense.

SLAUGHTER HOUSES.

Floor or Pavement-Cleansing—blood and offal.

SEC. 22. Every person owning, operating or having the charge, care and custody of any packing house or slaughtering establishment within the city of Milwaukee, authorized or permitted by this chapter, shall cause the same to be provided with a tight plank floor, or to be paved with brick or stone, and if paved, the earth below shall be sufficiently solid to prevent its becoming the receptacle of filth or offensive matter. Such floor or pavement shall be so constructed as to carry off, into a tub or reservoir to be provided for that purpose, all blood and offal; and at the end of each day, when killing has been done on the premises, the same shall be thoroughly washed and cleansed, and the tubs and vessels containing the blood and offal emptied and cleansed; and between the fifteenth day of April and the first day of November, in each and every year, all offal and blood shall be buried and covered with fresh earth or ashes to the depth of at least two feet upon the day when any animal or animals from whom such blood or offal shall be obtained has been slaughtered thereat, and all such packing and slaughter houses shall be kept in a thoroughly cleanly and healthy condition, and no nuisance be permitted to remain thereon or thereat. Each and every person who shall violate or fail to comply with the provisions of this section shall be punished by a fine not less than one hundred nor more than three hundred dollars for each and every offense.

Summer slaughtering by butchers.

SEC 23. Butchers or other persons doing business in the city of Milwaukee in slaughtering animals for retail or other trade, are hereby authorized to make contracts or arrangements with the proprietors of any of the slaughter houses or packing establishments located in the Menomonee river valley, or at the mouth of the Milwaukee river, in this city, for the right or privilege of slaughtering therein beef cattle, consisting of oxen, two and three year old steers, cows and heifers, during the months of May, June, July, August and September in each year; and the slaughtering of such animals as are above described at any other place within the limits during the months above mentioned is hereby prohibited under a penalty of not less than one hundred dollars nor exceeding three hundred dollars.*

Slaughter of small animals in city.

SEC. 24. Any person or persons doing a retail meat market business in the city of Milwaukee are hereby ruthorized and permitted to slaughter calves, swine, sheep and other small animals at all seasons of the year, on the premises occupied by such person or persons; *provided*, that the premises or places where such slaughtering is or may be done, and where the meats are sold, be kept at all times in a cleanly and good condition, so that no nauseous affluvia or smell shall proceed from, emanate or be produced by the offal, blood or any other part or portion of such animals, and in case any butcher or other person or persons who may slaughter animals on his or their own premises, shall fail to keep such premises in a good sanitary condition, as hereinbefore provided, at all times, such butcher or other person or persons shall forfeit and pay a fine of not less than one hundred dollars nor more than three hundred dollars, together with all costs of prosecution; and in default of the payment of such fine and costs, shall be imprisoned in the county jail of the county of Milwaukee for a term not exceeding thirty days.

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*An additional slaughtering place has been provided by the following

ORDINANCE.

To establish a city slaughter house on the east side of the City of Milwaukee.

The Mayor and Common Council of the City of Milwaukee do ordain as follows:

SECTION 1. That for the further convenience of city butchers the buildings situate on lots 1, 2, 13 and 14, in block 169, in the Third ward of the city of Milwaukee, and owned by John Furlong, be designated as a city slaughter house, to be used by any or all butchers who may choose to do so. The said John Furlong agreeing to keep said premises free from all offensive and unhealthful smells, and in a sanitary point of view to be under the supervision and direction of the Commissioner of Health of the City of Milwaukee.

Passed January 15th, 1877.

Sick or diseased animals or meat.

SEC. 25. Any person who shall slaughter in the city of Milwaukee any sick or diseased animal for the purpose of selling the flesh thereof as meat, or who shall sell or offer or expose for sale in said city the flesh of any such sick or diseased animal, or diseased or blown flesh or meat, of any kind whatever, shall, upon conviction thereof, be punished by a fine not less than one hundred nor more than three hundred dollars.

Inspection of Slaughter houses.

SEC. 26. It shall be the duty of the Commissioner of Health of the city to examine all slaughter and packing houses, markets and butcher shops in said city, and diligently to inquire into any infractions or violations of this chapter, and to cause all persons violating any of the provisions thereof to be immediately prosecuted therefor. Said Commissioner of Health shall have and be permitted, at all reasonable and usual hours of the day, free access to any and all slaughter houses, packing houses, markets or butcher shops in the city for the purpose of inspecting and examining the same, and any person who shall interfere with, hinder, delay, molest or prevent such Commissioner of Health in the discharge of his duty, shall, upon conviction thereof, be punished by a fine not less than one hundred nor more than three hundred dollars.

Inspection of Live Stock.

SEC. 32. For the purpose of promoting and securing the general health of the inhabitants of the city of

Milwaukee, the Commissioner of Health of this city is hereby further authorized to adopt such measures and give all such directions to any of his assistants, for the proper inspection of all live stock, cattle, sheep, calves, geese, poultry or other animals which may come to the city of Milwaukee, or be sold or offered for sale, or which may be found within the limits of said city, as in the opinion of said Commissioner shall be deemed necessary.

Branding of maimed or diseased cattle.

SEC. 33. Said Commissioner of Health is also authorized to cause to be branded or marked any cattle, sheep, calves, swine, geese, poultry or other animals which, upon proper inspection, shall be found maimed, mutilated or diseased, and every person who shall sell or offer for sale or give away, for the purpose of food, any such animal branded or marked as aforesaid, shall forfeit a penalty of not less than ten dollars nor more than one hundred dollars for each offense.

Penalty for selling unwholesome meat.

SEC. 34. If any person shall sell or expose for sale, or give away for the purpose of food, any unwholesome, stale, emaciated, blown, stuffed, tainted, putrid or measley meat, fish or poultry, or the meat of any animal which shall have been branded or marked as aforesaid, such person shall forfeit a penalty of not less than ten dollars nor more than one hundred dollars for each offense; and the meat, fish or poultry so sold or exposed for sale, or given away, shall, without delay, upon the view of the Commissioner of Health, or any of his assistants, be seized or destroyed.

Penalty fcr selling calves less than four weeks old.

SEC. 35. Whoever kills, or causes to be killed, for the purpose of sale, any calf less than four weeks old, or knowingly sells, or has in his possession with intent to sell, the meat of any calf killed when less than four weeks old, shall be punished by fine not exceeding one hundred dollars, and all such meat exposed for sale or kept with intent to make sale thereof, may be seized and destroyed by the Commissioner of Health, or by any of his assistants acting by direction of said Commissioner.

The preceding sections have been somewhat modified by the following

ORDINANCE.

To provide for the slaughtering and killing of beef, swine, calves, sheep and other animals, and for the regulating of butcher shops and their place of killing, that same may be inoffensive, and in good sanitary condition.

The Mayor and Common Council of the City of Milwaukee, do ordain as Follows:

Slaughtering places of meat markets to be kept clean

SECTION 1. That every butcher, or other person, owning, leasing, or occupying any place, room, store, shop or building where cattle have been, or are killed or dressed, and any person being the owner, lessee or occupant of any room, store, shop or stable, or other place or market, public or private, where cattle are kept or slaughtered for sale, or sold after being slaughtered, shall cause such place, room, store, shop, stable or building, or market or stable, public or private, and the yards and other premises belonging to same, to be thoroughly cleaned and purified. All offal, blood, fat, refuse matter, garbage or other unwholesome or offensive matter, to be removed therefrom, at least once in every twenty-four hours, after the use thereof for any of the purposes herein referred to, and shall at all times, unless released therefrom by the Commissioner of Health, or those acting under the authority of said Commissioner, keep all woodwork, save the floors, counters and meat blocks, in any building or place or premises aforesaid thoroughly painted, whitewashed and otherwise cleaned.

SEC. 2 Every such building, or place or premises mentioned in the last preceding section, shall be adequately and thoroughly ventilated. No blood shall be allowed to remain therein over night. Underground connection shall be made from every such place as aforesaid with public sewer, if such sewer be in the street, and if no sewer exists in the street, then, with a water tight wooden reservoir, or a receiver, or a reservoir made of brick, laid in cement, and water tight, and the floor of such building on which the slaughtering is done shall be either cemented, or made of heavy plank, matched and grooved and impervious to water or leakage, so as not to absorb the washing and cleaning of said place, or the accidental discharge of blood on same and carried into the reservoir, whether of brick or wood as aforesaid. A water tight gutter shall be constructed in the floor to convey all the washings aforesaid into the reservoir or gutter leading to the street sewer.

Iron vessels for catching blood.

SEC. 3. The blood of all animals slaughtered in the places, referred to in the preceding sections, shall be received in iron vessels of adequate capacity, so as to prevent any of said blood saturating or falling on the floor, and then emptied into a barrel properly covered, for removal.

Slaughtering places defined.

SEC. 4. That the slaughtering of animals in the places and on the premises hereinbefore referred to in the preceding sections shall mean the killing of cattle, calves, sheep, swine and other animals sold as butchers meat.

Butchers and others to answer questions.

SEC. 5. That every butcher or other person shall and will be expected to answer all proper questions asked by the Commissioner of Health, or any of his employes, relative to the management of their premises, and the condition of their premises. Free access shall at all reasonable hours be had to such places for inspection by the Commissioner of Health or any of his employes.

How unwholesome meat is to be condemned and disposed of.

SEC. 6. That upon any cattle, meat or fish, birds, fowls, fruit or vegetables, being found by any sanitary officer of the Commissioner of Health, or by those employed by said Commissioner, or any member of the Police in a condition which in his opinion is unfit for use as human food, or of a less weight or quality than that prescribed in the ordinances of the city respecting same, he shall cause the same to be examined by two respectable persons reasonably competent to judge in respect thereto, and if both said persons disagree with him in opinion in respect thereto, he shall take no action and give no order relative to the same without first consulting with the Health Commissioner. If both such persons agree with him in respect to such article being unfit for sale, then he may order it removed, or brand it, and insert kerosene oil, or other offensive smelling material, so as that same cannot be disposed of otherwise than for soap fat. The sanitary policeman shall cause same to be removed, if not removed by the owner after a reasonable time and disposed of as may be most convenient for the health department.

Penalty.

SEC. 7. Any person violating any of the provisions of this ordinance shall upon conviction pay such fine not exceeding fifty dollars, as the court may impose, or by imprisonment in the county jail not exceeding ninety days.

SEC. 8. This ordinance shall take effect immediately after its passage and publication.

SEC. 9. All ordinances or parts of ordinances contravening the provisions of this ordinance are hereby repealed.

Repealing clause.

Passed January 22, 1877.

DISTILLERIES AND OFFENSIVE TRADES.

SECTION 27. It is hereby made the duty of the Commissioner of Health of the city of Milwaukee to examine into the condition of all distilleries, slaughtering establishments, establishments for steaming or rendering lard, tallow, offal or such other substances as can or may be rendered, and all establishments or places where any nauseous, offensive or unwholesome business may be carried on, situated or located on the Milwaukee, Menomonee or Kinnickinnick rivers, or their branches, within the limits of the county of Milwaukee, or any canal connected with any of said rivers within said county, or on any lot or parcel of land within the city of Milwaukee, or within the distance of four miles therefrom, and further to consider and take, or cause to be taken, all such measures for cleansing and purifying all such distilleries, establishments and places as in his opinion shall be deemed necessary to promote and secure the general health of the inhabitants of the city of Milwaukee and to preserve the public health in said city.

SEC. 28. The Commissioner of Health shall give all such directions and adopt such measures for cleansing and purifying all such distilleries, establishments and other places where any nauseous, offensive or unwholesome business may be carried on as aforesaid, and the lots or parcels of land on which the same may be situated, and for causing the removal therefrom of all nauseous substances producing a disagreeable smell, or tending to cause sickness or disease in the city of

Cleansing of distilleries, etc.

Milwaukee, as in his opinion shall be deemed necessary; and he may do or cause to be done whatever in his judgment shall be needful to carry out such measures. Every person who shall disobey any order of the Commissioner of Health which shall have been personally served upon him requiring him to abate or remove any nuisance or cleanse or purify any premises, distillery establishment or place referred to in the preceding section, and owned or occupied by him in the manner or at the time described in the order, shall, on complaint of the Commissioner of Health, be liable to arrest and summary trial and punishment by fine not exceeding five hundred dollars, or by imprisonment not exceeding six months, or by both such fine and imprisonment.

Suppressing of distilleries, etc.

SEC. 29. It shall be the duty of the Commissioner of Health, on complaint being made to him, and whenever he shall deem the business, trade or profession carried on by any person or persons, or corporation, in any distillery establishment or place referred to in section twenty-seven of this chapter detrimental to the public health, to notify such person, persons or corporation, to show cause before the Commissioner of Health at a time and place specified in such notice, why such business, trade or profession should not be discontinued or removed, which notice shall not be less than three days, (except that in cases of epidemic or pestilence the Commissioner of Health may by general order direct a shorter time, not less than twenty-four hours) and may be served by leaving the same at the place of business or residence of the parties to be effected thereby. Cause may be shown by affidavit, and if, in the opinion of the Commissioner of Health, no good and sufficient cause be shown why such business, trade or profession should not be discontinued or removed, the Commissioner shall order the said parties to discontinue or remove the same within such time as the Commissioner may deem reasonable and necessary, and the order of the Commissioner shall be final and conclusive.

Penalty.

SEC. 30. Any person or persons failing or refusing to obey such lawful order of the Commissioner of Health shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine of not more than two hundred and fifty dollars, or by imprisonment not more than one year, or by both such fine and imprisonment, and such person or persons shall be subject to like punishment for each and every day that he, she or they shall continue such business, trade or profession after the expiration of the time specified in the order of the Commissioner of Health for the discontinuance or removal of the same.

Section 36, by implication, and sections 37, 38, 39, 40, 41, 42, 43 and 44, expressly, have been repealed by the following

ORDINANCE CONCERNING SCAVENGERS:

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. No person, company or corporation within the city of Milwaukee shall empty, clean or remove the contents of any privy vault, except in the manner prescribed in this ordinance, and in pursuance of the directions, regulations and requirements of the Commissioner of Health.

Scavenger defined.

SEC. 2. Any person, company or corporation who shall engage in the business of emptying, cleaning or removing the contents of privy vaults, shall be deemed a scavenger within the meaning of this ordinance.

Each savenger must have license and give bond

SEC. *3. No person, company or corporation shall exercise the business of scavenger in the city of Milwaukee without first having obtained a license therefor; such permit shall give the name of the scavenger, also describe the premises where such work is to be done and where the same shall be deposited. Each such scavenger shall pay for the use of the city the sum of ten dollars, and no other fees; such license shall be for one year from the date of issuing the same, and shall be issued by the Mayor to any such person, company or corporation desiring to do scavenger work, upon the execution of a bond to the city by such scavenger, in the penal sum of one hundred dollars, with not less than two sureties, conditioned that said scavenger shall comply with the provisions of this and any ordinance which may be hereafter passed by the Common Council touching their said employment, and shall also comply with and obey the directions and regulations of the Commissioner of Health of the city made in pursuance of law

Privy vaults to be properly cleaned.

SEC. 4. The cleaning, emptying and removing of the contents of privy-vaults shall be done in an inoffensive manner, and any scavenger having begun any such scavenger work shall, without any interruption or delay, finish the same, and shall in every instance leave the privy in as good condition upon the vault as when the work was undertaken.

SEC. 5. The contents of privy-vaults so removed by any scavenger shall be conveyed beyond the city limits in air-tight tanks or vessels, and shall be disposed of in such manner as to cause no offense; said tanks shall be kept clean and inoffensive when not in actual use.

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*This section is a subsequent amendment, inserted in the proper place, passed December 10, 1877.

SEC. 6. No privy-vault shall be cleaned, emptied or removed, except by a licensed scavenger. The Commissioner of Health may prescribe such details for the doing of such scavenger work as the proper enforcement of this ordinance shall require.

Only licensed scavengers may clean.

SEC. 7. Any person who shall be guilty of doing any scavenger work in the city of Milwaukee without first having obtained a license therefor, as provided for in this ordinance, shall be fined not less than ten dollars nor more than fifty dollars for each and every offense.

Penalty.

SEC. 8. Scavengers who engage in the business of removing the contents of privy vaults at night shall cause to be painted upon the wagon-box of their wagons, in letters and figures, his name and number of the license, together with a lighted lamp with plain glass fronts and sides, with the number of the license of such wagon painted with black paint on the sides and front of each of said lamps in distinct and legible figures at least two inches in size, and so placed that said lamps may be distinctly seen and said number easily read.

Scavenger wagons to be marked.

It shall be the right and duty of such night scavenger so licensed, when requested by any owner, agent or occupant of any privy within the city, to clean and remove the contents of the vault thereof, and to remove and deposit the same at such place or places as shall or may be designated by the Commissioner of Health of the City of Milwaukee, or in such place as said scavenger may select, provided that the same is so disposed of, as not to create a nuisance.

Any owner, driver or manager of any such night wagon, who shall violate any provision of this section, shall be fined not less than ten dollars nor more than fifty dollars for each and every offense, and shall have his license revoked.

Penalty.

Owners, etc., must have permit.

SEC. 9. Owners, occupants or agents of privy-vaults within the city desiring to clean and remove the contents thereof themselves, without the aid of night scavengers, shall not be allowed to do so except upon the written permission of the Commissioner of Health, and then only in such manner as he, in said permit, shall direct.

Lawful charge.

SEC. 10. Night scavengers shall be allowed to charge and receive for each load so by them taken and removed, of not less than twenty-seven cubic feet, a sum not exceeding three dollars for each and every load so removed.

Owners, etc., to be notified.

SEC. 11. Whenever, in the opinion of the Commissioner of Health, any privy-vault shall be offensive and need cleaning, it shall be his duty to notify the owner, agent or occupant to cleanse the same within a period named in said notice, also to serve a printed copy of this ordinance; unless the person so notified shall comply within the time mentioned, it shall be the duty of said officer to cause said vault to be cleaned by one or more of the city scavengers aforesaid, and such person so failing to comply with said notice shall, on conviction, be fined in a sum not less than ten dollars nor more than fifty dollars for each and every offense:

Provided, that nothing in this section contained shall discharge the owner, agent or occupant of the premises from any liability otherwise provided to pay all the expenses of such cleaning.

In case no owner or agent can be found in the city, such Commissioner shall cause such offensive vault to be cleaned, and in either case the expense shall be collected as in other cases of the removal or abatement of nuisances.

Scavengers to make certified returns.

SEC. 12. Scavengers shall make a return of such permit to the Commissioner of Health, certifying to the number of yards or loads which they may have removed from the vault or vaults therein described, also where the same was deposited, within five days after the work shall have been performed.

SEC. 13. Any scavenger who shall violate any provision of this ordinance, or shall fail to comply with any order, direction or regulation lawfully made by the Commissioner of Health, shall be fined not less than ten dollars nor more than fifty dollars for each and every offense, and shall be subject to a revocation of license, in the discretion of the Mayor.

Repealing clause.

SEC. 14. Sections thirty-seven to forty-four, inclusive, of chapter twelve of the general ordinances of the city, passed April 20th, 1875, and all other ordinances or parts of ordinances conflicting or inconsistent with the provisions of this ordinance, are hereby repealed.

SEC. 15. This ordinance shall be in force from and after its passage and publication.

Passed October 29, 1877.

PENALTIES FOR VIOLATING CHAPTER XIII OF THE CHARTER.

Fines for violation of charter.

SECTION 45. It is hereby declared and ordained that it is necessary for the peace, good order, and health of the city of Milwaukee, to impose fines by ordinance for all violations within the limits of the said city, of chapter thirteen of an act of the legislature of the State of Wisconsin, entitled, "An act to revise, consolidate and amend the charter of the city of Milwaukee, approved February 20, 1852, and the several acts amendatory thereof," approved March 10th, 1874, being chapter 184 of the laws of 1874.

Penalty for disobeying orders of Commissioner of Health.

SEC. 46. Every person who shall disobey any order of the Commissioner of Health of this city, made under and in pursuance of section five, of chapter thirteen of the act of the legislature mentioned in the preceding section, which shall have been personally served upon him, shall, on complaint of the Commissioner of Health, or any person serving such order, before the municipal court, be punished by a fine not exceeding five hundred dollars, or by imprisonment not exceeding six months, or by both such fine and imprisonment.

Penalty for hindering Commissioner of Health.

SEC. 47. Every person who shall in any manner resist or hinder any person employed under or by authority of the said Commissioner of Health under and in pursuance of section seven of said chapter thirteen, of the said act of the legislature, shall, upon conviction thereof, be punished by a fine not exceeding two hundred and fifty dollars, or imprisonment not exceeding six months, or both.

Penalty in aid of Commissioner of Health.

SEC. 48. Any person or persons failing or refusing to obey any lawful order of the said Commissioner of Health, made under and in pursuance of section eight of said chapter thirteen, of the said act of the legislature, shall, upon conviction thereof, be punished by a fine of not more than two hundred and fifty dollars, or by imprisonment not more than one year, or both, and be subject to the like punishment for each and every day that he, she or they shall continue the business, trade or profession specified in such order of the said Commissioner of Health, for the removal of the same.

Penalty on physicians failing to report to Commissioner of Health.

SEC. 49. Any practicing physician who shall neglect or refuse to perform the duties required of him by or in any section of said chapter thirteen, of the said act of the legislature, shall, upon conviction thereof, be punished by a fine of not more than two hundred and fifty dollars for each offense.

SEC. 31. The Commissioner of Health shall not be held personally liable for the expense of, or damages recovered by, any suit which may be brought against him on account of any act performed by him in the execution of the duties prescribed by this chapter or any section thereof.

INSPECTION OF FRUIT.

The following sections of chapter XII of the general ordinances of the city of Milwaukee are now practically in abeyance, though unrepealed. The Municipal Court, the Commissioner of Health is informed, has refused to enforce them, but their validity has not been tested by a writ of error to the Supreme Court of the state.

Appointment of fruit inspector.

SECTION 50. The Mayor shall annually, on the first day of May, or within one week thereafter, appoint, subject to the confirmation of the Common Council, a competent person to be inspector of fruits and berries within and for the city of Milwaukee, who shall hold his office for the period of one year, and until his successor shall be duly appointed and qualified.

Oath and bond.

SEC. 51. The inspector of fruits and berries, shall, before entering upon the duties of his office, take and subscribe an oath of office, to support the constitution and laws of the state, and to faithfully perform the duties of his office, and file the same with the clerk, and shall execute a bond in the penal sum of one thousand dollars, with two sureties, who shall severally justify as to their liability for that amount, over and above all debts, liabilities and property exempt from execution, conditioned that he will at all times faithfully, honestly and impartially fulfill the duties of his office.

May appoint deputies.

SEC. 52. The inspector of fruits and berries shall also be empowered to appoint as many deputies to act under him as he may deem necessary, and for the acts and conduct of which he shall at all times be accountable and liable; *provided, however*, that the city shall not be liable for the compensation of any of the deputies so appointed by him.

Fees.

SEC. 53. The inspector of fruits and berries shall be entitled to demand and collect the following fees for inspection:

For inspecting every package containing one barrel or over, 5 cts.

For inspecting every package containing one-half bushel or over, and less than one barrel, 3 cents.

For inspecting every package containing one-half peck and less than one-half bushel, 1 cent.

For inspecting berries and small fruits packed in boxes of one quart or less, 3 cents per dozen boxes, and when inspected in bulk, ¼ cent per quart.

Duties.

SEC. 54. It shall be the duty of the inspector to inspect or cause to be inspected peaches, grapes and all other fruits and berries which shall be offered or exposed for sale at retail in baskets, boxes or packages, on any vessel, dock, street, alley or sidewalk, or in any warehouse within the limits of the city of Milwaukee, and it shall also be his duty to inspect or cause to be inspected all fruit, berries and vegetables in said city not already required to be inspected by him, as hereinabove provided, whenever thereto requested by the dealer therein.

All inspection upon peaches, berries and small fruits liable to decay, sour or become unwholesome, shall be good for one day only during the months of July, August and September, and for two days in the other remaining months of the year.

May enter warehouses and vessels.

SEC. 55. The inspector of fruits and berries, and his duly appointed deputies, are hereby authorized and empowered to enter any warehouse or vessel, situate, lying, or being within the limits of the city of Milwaukee, where fruits or berries shall be offered or exposed for sale at retail, in baskets, boxes, or packages, and to inspect all such fruits and berries as provided in the last preceding section.

Inspection.

SEC. 56. It shall be the duty of the inspector to mark or place upon each basket, box, package, bag, barrel or case, in which any fruit, berries or vegetables, inspected by him may be contained, the word "Inspected," the date of the inspection, and the name of the inspector who made the same, and in case the same shall be fraudulently packed, or shall be of an inferior or indifferent quality in the center or bottom of the basket, barrel, box, or other package, than that which is exhibited upon the top, he shall add the word "Rejected."

Penalties.

SEC. 57. If any person shall, within the limits of the city of Milwaukee, sell or offer for sale, or exhibit for sale any tainted, soured, or unwholesome fruit, berries or vegetables, or which shall have been inspected and marked by said inspector "rejected," or shall offer for sale any fruit or berries, which shall be deficient in weight or measure, for which he sells the same or offers and exhibits the same for sale, or shall offer to sell, or sell, or exhibit for sale, fruit or berries fraudulently packed, or which shall be of an inferior or indifferent quality in the center or bottom of the basket, barrel, box, or other package than that which is exhibited upon the top, or part open for inspection; or who shall practice any fraud or deception in the exhibition and sale of the same in any manner whatever, and shall be convicted thereof, shall be liable to a penalty of not less than five nor more than twenty-five dollars for each and every offense.

Badge of office.

SEC. 58. The inspector and each of his deputies shall wear a badge, on which shall be displayed his name and title of office, and every person who shall hinder or resist the inspector or any of his deputies in the discharge of his or their duties, or who shall refuse to pay all legal fees charged for the inspection of berries, fruits or vegetables, made as aforesaid, to said inspector or his deputies, or who shall in any way hinder or prevent him or them from discharging his or their duty, as such officer, shall be liable to a penalty of not less than five, nor more than twenty-five dollars for each and every offense.

Penalty for again using stamped basket, etc.

SEC. 59. It shall be unlawful for any person to refill or repack any barrel, box, basket, crate or other package with fruit, berries or vegetables, on which there shall remain the inspection marks of the inspector or any of his deputies, and any person who shall thus refill or repack any such package, or sell the same, or offer to sell the same, or exhibit berries, fruits or vegetables for sale in any such barrel, box, basket, or other package, shall be liable to a penalty of not less than ten dollars, nor more than one hundred dollars for each and every such offense.

These sections have been modified by the following

ORDINANCE

To regulate the selling of fruits and berries.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. It shall be unlawful for any person to sell or offer for sale fruits or berries within the city of Milwaukee, except by the barrel, bushel or some aliquot part of a bushel, according to the table of dry measures, nor shall it be lawful to sell fruits or berries in packages, except every such package contain a barrel, a bushel, or some aliquot part of a bushel, according to the table of dry measure, provided that this section shall not apply to dry or preserved fruits and berries, or to the sale of fruits retailed at a fixed price per piece or number.

SEC. 2. All fruits or berries, fresh or dried, sold or offered for sale in the city of Milwaukee, in packages, shall be of equal goodness in every part of the package.

SEC. 3. Any person or persons guilty of a violation of any provisions of either of the foregoing sections shall, upon conviction, be fined not less than five dollars nor more than twenty-five dollars for every such violation.

SEC. 4. This ordinance shall be in force and effect from and after its passage and publication.

Passed June 18, 1877.

MISCELLANEOUS ORDINANCES NOW IN FORCE.

To prohibit the rendering of dead animals.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. No person or persons, corporation or corporations shall render or try out any dead undressed hogs, cattle or other animals, or any decayed, putrid or unsound animal matter in the city of Milwaukee, under a penalty of not less than twenty-five dollars nor exceeding two hundred dollars for each and every offense.

SEC. 2. This ordinance shall take effect and be in force from and after its passage and publication.

Passed January 7, 1877.

To prohibit the cutting of ice in waters below the discharge of sewers, for drinking or eating purposes.

The Mayor and Common Covncil of the City of Milwaukee, do ordain as follows:

SECTION 1. No person shall cut any ice in, or take any ice from any river, canal, bayou, basin or slip, within the bounds of the city of Milwaukee, at any point below the discharge of any sewer in said city, with the intention of selling or using such ice, or causing the same to be sold or used for drinking or eating purposes, and any person who shall violate any of the provisions of this section, shall be punished by a fine of not less than ten dollars nor more than one hundred dollars for each and every offense.

SEC. 2. Every person who shall knowingly use or cause to be used for drinking or eating purposes, any ice cut in or taken from any river, canal, bayou, basin or slip, within the bounds of the city of Milwaukee, at any point below the discharge of any sewer in said city, shall be punished by a fine of not less than ten dollars, nor more than one hundred dollars for each and every offense.

SEC. 3. This ordinance shall take effect and be in force from and after its passage and publication.

Passed January 22, 1877.

Relating to public nuisances.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. It shall be the duty of the Health Commissioner to keep in his office a book in which he shall enter all complaints and notices which may be made to or filed with the Commissioner of Health, of the existance of any public nuisance within the limits of the city of Milwaukee, and to make to the Common Council at every regular meeting of the same, a written report of the complaints and notices relating to public nuisances made or filed as aforesaid, since the adjournment of the preceding regular meeting of the Common Council, stating in such report when the complaint or notice of the existence of a public nuisance was received, the nature of the nuisance complained of, when and how the same was removed, or if not removed, the reason for not removing the same.

SEC. 2. This ordinance shall take effect and be in force from and after its passage and publication.

Passed February 26, 1877.

To regulate the Markets in the city of Milwaukee.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. The following grounds and the buildings thereon shall be, until further order, the markets of the city for the sale of provisions, vegetables, and other articles of food necessary for the sustenance and convenience of the inhabitants of the city, and of all garden products:

On the East Side, so much of block No. 152, in the First ward, as is at present devoted to market purposes.

On the West side, the market hall and public ground east of block No. 165, in the Second ward.

On the South side, block No. 18, in the Fifth ward, and any buildings thereon except the one erected for a police station and for fire apparatus.

SEC. 2. On said markets all market wagons, or other vehicles, blocks, benches, tubs, barrels, or other devices necessary for the convenience or sale of any articles shall stand and be placed in such order as shall be prescribed by the regulations established or to be established by the proprietors or the committee having legally charge of any of said markets; provided, that such regulations shall be subject to the approval of the Common Council of the city of Milwaukee.

SEC. 3. The officers and employes of any of said markets shall perform such additional duties as may be imposed upon them by the Common Council and the Commisrioner of Health of the city of Milwaukee.

SEC. 4. Any person who shall resist, hinder or obstruct the officers or employes of any of said markets in the lawful discharge of the duties imposed upon them, shall upon conviction thereof be fined in any sum not exceeding twenty-five dollars.

SEC. 5. Chapter XVI, of the general ordinances of the city of Milwaukee, and all other ordinances and parts of ordinances contravening with the provisions of this ordinance are hereby repealed.

Passed May 21, 1877.

For the preservation of the public health of the city of Milwaukee.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. It shall be the duty of the Commissioner of Health to cause a notice, printed or written in large letters, to be placed upon all the outside doors of any house in the city of Milwaukee, in which any person may be affected or sick with small-pox, scarlet fever or diphtheria, upon which shall be written, or printed, the name of such disease; and such notice shall remain upon such house until the case shall cease to exist; and such house shall have been thoroughly disinfected; and if any person or persons shall deface, alter, mutilate, destroy, or tear down such notice, without permission of the Commissioner of Health, such person or persons shall be liable for each offense to pay a fine of not less than twenty-five dollars, nor more than fifty dollars; the occupant of any house upon which such notice shall be placed or posted as aforesaid, shall be held responsible for the removal of the same, and if the same shall be removed without the permission of the Commissioner of Health, such occupant shall be subject to the like fine of hot less than twenty-five dollars nor more than fifty dollars, unless he shall notify the Commissioner of Health within twenty-four hours after the removal of the said notice.

SEC. 2. In all cases when from current rumors or for any other reason a suspicion exists that the small-pox, scarlet fever or diphtheria prevails in any family or household, it shall be the duty of the Commissioner of Health to ascertain personally whether such is the case, and if upon examination it is fonnd that small-pox, scarlet fever or diphtheria exists in such family or household, and that its existence was not reported by the attending physician or other person whose duty it would be under existing ordinances to report to the Health department, said attendant physician or other person shall be subject to a fine of not less than ten dollars for each offense.

Sec. 3. This ordinance shall take effect and be in force from and after its passage and publication.

Passed November 12, 1877.

To prohibit the sale of impure milk in the City of Milwaukee.

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

Section 1. All persons are hereby prohibited from selling, giving away, or offering to sell or give away, for the purpose of food, any impure or unwholesome milk within the limits of the City of Milwaukee.

Sec. 2. Every person who shall offend against the preceding section, shall, upon conviction thereof, be punished by a fine not to exceed the sum of fifty dollars for each such offense.

Sec. 3. This ordinance shall take effect and be in force from and after its passage and publication.

Passed August 19, 1878.

To prohibit the keeping of swine in the city of Milwaukee.*

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

Section 1. All persons are hereby prohibited from keeping any swine in the city of Milwaukee either on the streets, alleys and public grounds of the city, or upon any lot, part of lot or parcel of land whatever, within the limits of said city, except

That portion of the First ward lying north of North street.

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*The power of a municipal government to regulate, restrict, or prohibit the keeping of swiue within its jurisdiction, unless it is restrained by legislative act or constitutional provision, is well grounded in the Common Law. "Particularly," says Blackstone, Commentaries, B. IV., chap. XIII, "the keeping of hogs in any city or market-town is indictable as a public nuisance." See authorities cited *ad locum*. It is not essential, in order to constitute this a nuisance, that the smell or other inconvenience complained of should be unwholesome; it is sufficient if it impairs the enjoyment of life or property. 1 Burr, 333.

That portion of the Thirteenth ward lying north of Center street;

That portion of the Tenth ward lying north of North street;

That portion of the Ninth ward lying north of North street and west of Nineteenth street;

That portion of the Second ward lying west of Nineteenth street;

That portion of the Fourth ward known as Palmer's addition;

That portion of the Eighth ward lying west of Muskego road and Eleventh avenue;

That portion of the Eleventh ward lying west of Eleventh avenue and south of Grant street;

And that portion of the Twelfth ward lying south of Becher street and east of the Chicago, Milwaukee and St. Paul railroad track;

In which portions of the city each separate household may keep two swine for family use under such reasonable regulations for cleanliness and the comfort of neighbors as the Commissioner of Health may impose.

SEC. 2. Every person who shall be guilty of violating the preceding section, shall, upon conviction thereof, be fined not less than five nor more than fifty dollars for each such offense.

SEC. 3. This ordinance shall not apply to the cases of swine brought into the city of Milwaukee in droves or by car load or cargo for the purpose of being slaughtered or shipped or otherwise transported out of the city of Milwaukee.

SEC. 4. This ordinance shall take effect on and after the first day of February, eighteen hundred and seventy-nine.

Passed August 19, 1878.

PENALTIES NOT OTHERWISE PROVIDED FOR.

Section 1, of the "Conclusion" of the general ordinances of the city of Milwaukee, passed April 20, 1875, provides as follows:

Any person or persons who shall violate any of the provisions of these general ordinances, shall, in cases where no other penalty is provided, on conviction, be subject for each offense, to a fine of not less than one dollar, and not exceeding five hundred dollars, in the discretion of the court. **Penalty.**

With like application to subsequent ordinances an ordinance was passed September 2, 1878, which provides as follows:

Whereas, certain ordinances of the city of Milwaukee have been passed, approved and published since the 20th day of April, A. D. 1875, and are now in force in which no penalties for the violation thereof are imposed or prescribed, now therefore for the purpose of making said ordinances effectual,

The Mayor and Common Council of the City of Milwaukee, do ordain as follows:

SECTION 1. Any person or persons who shall violate any provision of any ordinance of the city of Milwaukee, passed, approved and published since the 20th day of April, A. D. 1875, and then being still in force, for the violation whereof no penalty is imposed or prescribed in and by such ordinance so violated, shall, upon conviction thereof, be fined not less than one dollar, nor more than two hundred dollars at the discretion of the court for each such offense. **Penalty.**

SEC. 2. This ordinance shall take effect from and after its passage and publication.

IV. COMMON LAW IN ITS APPLICATION TO HEALTH, OFFENSIVE TRADES AND UNSANITARY NUISANCES.

Section 13 of Article XIV of the constitution of Wisconsin makes "such parts of the Common Law," as are "not inconsistent with this constitution," "part of the law of this state until altered or suspended by the Legislature." As the legislation of the state, so far as the Health Department of Milwaukee is concerned, is nearly all embraced in the provisions of the charter and in the ordinances passed under its authority, it is important to add here an exposition of such parts of the Common Law as pertain to public health, offensive trades, etc.; for it will not only throw light upon statutes and municipal regulations now in force, but will also afford a sure guide in the administration of justice.

There is no question that certain offences against the comfort, well-being, and safety of the public, to which no existing statute or ordinance is applicable, may be reached and punished by the Common Law. For example, the Common Law alone, would adequately protect society against a conspiracy to maintain an unwholesome practice, to perpetuate a nuisance, or to resist the suppression of an offensive trade. The very foundations of state and municipal enactments are in the Common Law, modified by the sovereign will of the people expressed in constitutions. Ordinances and statutes, therefore, which have a sure basis of Common Law and are not expressly forbidden by constitutional provision, cannot be set aside by the courts without an abuse of power. It is an elementary principle, tersely stated by Chancellor Kent, that "The government may, by general regulations, interdict such use of property as would create nuisances, and become dangerous to the lives, or health, or peace, or comfort of the citizens. Unwholesome trades, slaughter houses, operations offensive to the senses, the deposit of powder, the application of steam-power to propel cars, the building with combustible materials, and the burial of the dead, may all be interdicted by law, in the midst of dense masses of population, on the general and rational principle, that every person ought so to use his property as not to injure his neighbors, and that private interests must be made subservient to the general interests of the community."*

From the Commentaries on the Criminal Law, by Mr. Bishop, who was called by Senator Sumner "the best living text writer on the jurisprudence of our country," certain sections are here taken, not in the order in which they occur in his book, which state and elucidate the adjudicated law on the subjects under consideration. These sections are all from the first volume of the fifth edition. The numbers of the sections are retained, so that referencc can easily be made to them in the treatise where they occur. In the hasty preparation of a health report, at the close of a laborious season, no one could expect me to undertake original investigations, through several thousand volumes of law reports in which are recorded the decisions of learned judges. Just what is needed to guide me in my own work, and to instruct the people for whom I am laboring, lies ready at hand, and the name of the able author will add great weight to the following brief chapters.

PROTECTION TO THE PUBLIC HEALTH.

§ 489. GENERAL DOCTRINE.—The protection of the public health is an interest of the first importance to every government. Without health, the members of the community cannot discharge duties either to the government or to one another. Therefore every thing of sufficient magnitude for the law's notice, calculated to impair the public health, is indictable at the common law.

§ 490. ILLUSTRATIONS — CONTAGIOUS DISEASES — FILTHY HOUSES—UNHEALTHY MANUFACTURIES.—For example, while for obvious reasons a man is not punishable for being sick of a conta-

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*Kent's Commentaries, part V., lec. XXXIV. See also the authorities cited *ad locum.*

gious disease, in his own house, though the house stands in a populous locality; and while his friends are not guilty of crime in declining to remove him;[*] yet, if the sick man goes out into the public way, carrying with him his infection to the danger of the public, or if one takes out an infected child, this act, at the common law, subjects the doer to an indictment.[†] So if one brings into a public a horse having a disease communicable by infection to man, as the glanders, he is indictable.[‡] And, in a New York case, the court observed: "It is a common nuisance, indictable, to divide a house in a town for poor people to inhabit in, by reason whereof it will be more dangerous in time of sickness and infection of the plague.[‖] So manufactures, lawful in themselves, may become nuisances, if erected in parts of towns where they cannot but greatly incommode the inhabitants, and destroy their health. Therefore, when cholera was supposed to be contagious,—a consideration, however, which does not directly appear to have influenced the decision,—it was held, that a dwelling house, divided into small apartments, thickly inhabited and kept in a filthy condition, was, during the cholera time, a nuisance, even abatable by persons residing near.[§]

§ 491. UNWHOLESOME FOOD—WATER—NOXIOUS TRADES.—For the like reason, to render unwholesome any thing to be consumed in the community, as bread which is to be eaten,[**] or a fountain, or well of water which is to be drank,—[††] or to sell or otherwise cause to be consumed provisions injurious to the health,* is an indictable offence. There can be no doubt this is so by the ancient common law; and, if it were not, there are English statutes to this effect, so old as to be common law with us.† Thus, also, the injury to the public health is one ground on which the carrying on of noxious trades in thickly settled neighborhoods is held to be a public crime.‡

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[*] Boom vs. Utica, 2 Barb. 104.

[†] Rex vs. Vantandillo, 4 M. & S. 73; Rex vs. Burnett, 4 M. & S. 272; 1 East P. C. 226.

[‡] Reg. vs Henson, Dears. 24, Eng. L. & Eq. 107.

[‖] Referring to 2 Rol. Ab. 139.

[§] Meeker vs. Van Rensselaer, 15 Wend. 397. See the State vs. Purse, 4 McCord, 472; People vs. Townsend, 3 Hill N. Y., 479; and as to the abatement of the nuisance, Welch vs. Stowell, 2 Doug. Mich. 332, and Moffett vs. Brewer, 1 Greene, Iowa, 348; Barclay vs. Commonwealth, 1 Casey, 503.

[**] Rex vs. Dixon, 3 M. & S. 11, 4 Camp. 12; Rex vs. Haynes, 4 M. & S. 214.

[††] The State vs. Buckman, 8 N. H. 203.

§ 492. QUARANTINE, ETC.—Considerations of public health enter into many statutory regulations, and regulations by municipal corporations, relating to affairs of internal police. The rules of quarantine‖ and other rules of a like nature§ might be mentioned by way of illustration. But the common law, not the statutes, is the subject of our present discussion.

OFFENSIVE TRADES.

§ 1138. GENERAL DOCTRINE—HOW MANY INJURED.—The carrying on of offensive trades, in populous places, is indictable on the ground of injury to the public health, also of disturbance to the public convenience. There is no necessity for both of these grounds to exist together in a particular case; but, if the senses, for instance, are offended by the smell,* or by the noise,† this is sufficient. There is no need the offensiveness should be such as to produce disease.‡ * * *

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*The State vs. Smith, 3 Hawks, 378; The State vs. Norton, 2 Ire. 40; Rex vs. Greene, 2 East P. C. 821; The State vs. Buckman, 8 N. H. 203. One who sells provisions for market is criminally responsible for any unsoundness or noxious quality which he knew of in them or which he might have known, by ordinary prudence and care. He may therefore be indictable, under some circumstances, for the acts of his agent or servant in this matter. Hunter vs. The State, 1 Head, 160.

†Burnby vs. Rollitt, 11 Gur. 827; 4 Bl. Com. 162, where this learned commentator says: "A second offence against public health is the selling of unwholesome provisions. To prevent which the statute of Hen. 3, stat. 6, and the ordinance for bakers, c. 7, prohibit the sale of corrupted wine, contagious or unwholesome flesh, * * * ; under pain of amercement for the first offence, pillory for the second, fine and imprisonment for the third, and abjuration of the town for the fourth. And by the statute 12 Cor. 2, 6, 25, § 11, any brewing or adulteration of wine is punished with the forfeiture of £100, if done by the wholesale merchant; and £40 if done by the vintner or retail trader."

‡Rex vs. Davey, 5 Esp. 217; Rex vs. Neil, 2 Car. and P. 485.

‖See Rex vs. Harris, 4 T. R. 202, 2 Leach, 4th ed. 549.

§See Commonwealth vs. Lahey, 5 Cush. 408; Harrison vs. Mayor of Baltimore, 1 Gill, 264.

§ 243. NOT EVERYBODY—NATURE TO EFFECT ALL—NUISANCE.—For an act to be injurious to the public, * * * how many persons must suffer, or be in danger of suffering from it? We cannot easily answer this question in brief and exact words; yet the idea is not difficult of comprehension. Not all the citizens of the country need be actually injured; but the wrong must be of a nature to produce injury to all; and, when carried fully out, must in fact injure all who are in the particular locality, or otherwise within the influence of the act. Thus an indictment for nuisance must allege that the thing done was to the common nuisance of *all* the citizens in the place, not merely of *divers* citizens.||

§ 244. NUISANCE CONTINUED—SMALL NUMBER.—Yet many things are indictable nuisances when done in populous places, being therefore actually detrimental to many, while they would be innocent if done in a retired locality, to which, at the same time, many might, if they chose, resort.§ And if what is done affects only a

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*Rex vs, Neil, 2 Car. and P. 485; Rex vs. White, 1 Bur. 333; Rex vs. Pierce, 2 Shaw, 327; Commonwealth vs. Brown, 13 Met. 365; The State vs. Weatherall, 5 Harring. Del. 487. And see Aldred's case, 9 Co. 57 *b*; People vs. Cunningham, 1 Denio, 524; Rex. vs. Davey, 5 Esp. 217.

†Anonymous, stated 2 Shaw, 327; See The State vs. Riggs, 22 Vt. 321; Commonwealth vs. Smith, 6 Cush. 80; Rex vs. Smith, 2 Stra. 704.

‡Ashbrook vs. Commonwealth, 1 Bush. 139. In a Texas civil case, it was laid down that a livery stable in a town is not necessarily a nuisance; but it may be so located, constructed, or kept, as to be such. And Wheeler, J., said: "What constitutes a nuisance is well defined. The word means, literally, annoyance; in law, it signifies, according to Blackstone, 'any thing that worketh hurt, inconvenience, or damage.'" Burditt vs. Swenson, 17 Texas, 489, 502.

||Commonwealth vs. Smith, 6 Cush. 80; Commonwealth vs. Harris, 5 Rand. 691; Rex vs. Medley, 6 Car. and P. 292; Reg. vs. Webb, 1 Den. C. C. 338, 2 Car. and P. 933, Temp. & M. 23, 13 Jur. 42.

§See Ellis vs. The State, 7 Blackf. 534; Rex. vs. Pierce, 2 Shaw, 327; Rex vs. Cross, 2 Car. and P. 483; Rex vs. Watts, Moody and M. 281; Reg. vs. Wigg, 2 Salk. 460, 2 Ld. Raym. 1163; Beatty vs. Gilmore, 4 Harris, Pa. 463, 469; Ray vs. Lynes, 10 Ala. 63; Rex vs. Carlile, 6 Car. and P. 636; Rex. vs. Neville, Peake, 91.

small number of persons,—in one case, it was said the inhabitants of three houses,[*] it is not indictable.[†] * * *

§ 1077. * * * * It may be stated here, as a general proposition, * * * , that, in the language of a learned Indiana judge, "every nuisance is annoying to only a few of the citizens of the particular place. They are the public of that locality. It is a public nuisance if it annoy such part of the public as necessarily come in contact with it."[‡]

§ 1138. CONFLICT BETWEEN USEFUL TRADES AND PLEASANT HOMES—TRADE ESTABLISHED IN PLACE BEFORE HABITATIONS—PRESCRIPTION.—The reader has no doubt called to mind the fact, that the community is as much benefitted by its members carrying on useful trades, as by their having pleasant homes. And growing out of this fact comes another proposition; namely, that, whenever a man has established himself, remote from habitations, in a business which is there lawful, and is useful to the community, those who settle afterwards near him have no right to complain of the offensiveness of this business; and so he is not indictable for continuing it.[||] Even if, after the coming of inhabitants, he makes in the form of his business some slight changes, and so renders its noxious character minutely different in kind, but not in degree, he may still, it seems, rely on his prior occupancy of the place. And his successors may stand on his acquired rights.[§] Even according to an English *nisi prius* case, a man may set up a new manufactory in the neighborhood of old ones, if the new, though noxious, does not materially enhance the discomfort of the community;* but otherwise, if it increases the mischief,† yet no man can gain a right to carry on an offensive trade, by prescription, where he cannot plead this prior occupancy,‡—a proposition, however. a little weakened by some English cases.||

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[*] Rex vs. Lloyd, 4 Esp. 200.

[†] Rex vs. Hornsey, 1 Rol. 406.

[‡] Stuart, J., in Hackney vs. The State.

[||] Ellis vs. The State, 7 Blackf. 534; Rex vs. Cross, 2 Car. and P. 483. Where one was indicted for the nuisance of keeping several barrels of gunpowder in a house in a village, sometimes two days, sometimes a week, till they could be conveniently sent to London, "Holt, C. J. resolved: First, that, to support his indictment, there must be apparent danger, or mischief already done. Secondly, that it had been done for fifty or sixty years, yet, if it be a nuisance, time will not make it lawful. Thirdly, if, at the time of setting up this house in which the powder was kept, there had been no houses near enough to be prejudiced by it, but some were built since, it would be at the peril of the builder. Fourthly, though gunpowder be a necessary thing, and for the defense of the kingdom, yet, if it be kept in such a place as it is dangerous to the inhabitants or passengers, it will be a nuisance." Anonymous, 12 Mod. 342.

[§] I do not see any case exactly covering the points stated in the last two sentences; but they are embraced within the doctrine of the cases cited in the next two notes.

§ 1141. TRADE ESTABLISHED, CONTINUED.—The doctrines of the [preceding] section * * are not harmonious with a late Massachusetts case, viewed in reference to some language used by the judge who delivered the opinion, though they harmonize with the exact point decided. The defendant was indicted for continuing the nuisance of a slaughter-house, which was originally erected remote from the public way and from habitations; but afterwards inhabitants settled in the place, and a public highway was laid out by the slaughter-house. The indictment was sustained. Now, it is submitted, on principle, that the coming of inhabitants to the place would not alone have justified the tribunal in proceeding against the proprietor of the slaughter-house, as for a nuisance. And the reason is, that men must eat, as well as breathe and exercise the sense of smelling; and, if a man makes provision, lawfully and properly, to supply his fellow-beings with food, no other thousand men can justly say to him, "We will set ourselves down by the side of your place, and you shall no more be permitted there to exercise your business of supplying the wants of ourselves and others." Yet clearly, proceeding now to another point in the case, the legislature of a State has the right so to control the industry of the public as to prevent any one man's industry from interfering with the industry of other men, or with their comfort. And if the legislature, or the subordinate power which acts under a legislative authority, causes a highway to be laid out in a particular place, the result should be deemed to be in effect a legislative direction for the removal of all

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*Rex vs. Neville, Peake, 91.

†Rex vs. Watts, Moody and M. 281.

‡People vs. Cunningham, 1 Denio, 524; Wright vs. Moore, 38 Ala. 593. See Ashbrook vs. Commonwealth, 1 Bush., 139.

||Rex vs. Watts, Moody and M. 281; Rex vs. Neville, Peake, 91, 93.

nuisances along the way. The judge, delivering the opinion of the court in this Massachusetts case, held the following language: "The public health, the welfare, and safety of the community, are matters of paramount importance, to which all the pursuits, occupations, and employments of individuals, inconsistent with their preservation, must yield. [This observation is most true.] It is therefore immaterial, so far as the government is concerned in the administration of the law for the general wellfare, how long a noxious practice may have prevailed, or illegal acts persisted in. [This also is true; bnt the doctrine laid down in the previous section, correctly viewed, does not rest on the idea of prescription, especially it does not rest on any right of a man to do for the one hundreth or the one millionth time an illegal act, because he has been permitted to go unpunished before.] Easements may be created in lands, and the rights of individuals may be wholly changed by adverse use and enjoyment, if it is sufficiently protracted; but the lapse of time does not equally affect the rights of States."* In harmony with the views developed in this section, it has been held in Kentucky that the carrying on an offensive business for more than thirty years, in a place removed from dwellings and public roads, does not authorize the owner to continue it after houses have been built and roads laid out in the vicinity, if it is then found to be a nuisance to those dwelling in the neighborhood and to passers by.†

§ 1142. NECESSARY TRADE — BREWER — CHANDLER, ETC.— Hawkins observes: "It hath been holden, that it is no common nuisance to make candles in a town, because the needfulness of them shall dispense with the noisomeness of the smell. But the reasonableness of this opinion seems justly to be questionable, because, whatever necessity there may be that candles be made, it cannot be pretended to be necessary to make them in a town; and surely the trade of a brewer is as necessary as that of a chandler; and yet it seems to be agreed, that a brew-house, erected in such an inconvenient place wherein the business cannot be carried on without greatly incommoding the neighborhood, may be indicted as a common nuisance; and so, in the like case, may a glass-house, or swine-yard."*

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*Commonwealth vs. Upton, 6 Gray, 473, 476, opinion by Merrick, J. Se also Brady vs. Weeks, 3 Barb. 157; Howell vs. McCoy, 3. Rawle, 256.

†Ashbrook vs. Commonwealth, 1 Bush. 139.

§ 1143. OTHER SPECIFIC NUISANCES.—Among other nuisances may be mentioned a lime-kiln,† a manufactory of acid spirit of sulphur,‡ a soap-boiling establishment,‖ and a livery-stable.§ But the criterion is not what business is carried on; but what is the effect of the business, as creating a nuisance or otherwise.

§ 1144. LEGISLATIVE PERMISSION.—It is competent, as already intimated, for a legislative act to regulate, directly or indirectly, this matter of indictable nuisance. Therefore it has been held in Wisconsin, that, when the legislature has authorized a citizen to establish a dam of specified height, at a place named, he is not liable to an indictment for any nuisance thereby created.** And on a similar ground, namely, that what the legislature authorizes cannot be, in law, a public nuisance, the Pennsylvania court has held, that works of internal improvement, erected by the State for the benefit of the citizens at large, do not become a public nuisance because they may render the neighborhood unhealthy by the reason of the obstruction of running water and the consequent overflowing of the adjacent lands; nor is their character changed by being transferred into the hands of a private corporation, obligated to keep the works up for the purpose of their creation.††

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*1 Hawk. P. C. Curren. ed. p. 694, § 10. In a civil case it was held, that the erection of a tallow furnace, by a chandler, to the annoyance of an innkeeper and his guests, is a nuisance for which an action will lie. "And so," said the court, "in Taohyle's case, who erected a tallow furnace across the street of Dennmark-house in the Strand, it was found a nuisance upon the indictment, and adjudged to be removed." Morley vs. Pragnell, Cro. Car. 510.

†Aldred's Case, 9 Co., 57 *b*.

‡Rex. vs. White, 1 Bur. 333.

‖Rex vs. Pierce, 2 Shaw. 327. As to a blacksmith's shop in a village, see Ray vs. Lynes, 10 Ala. 63.

§Ante. § 1138, note.

**Stoughton vs. The State, 5 Wis. 291; one judge dissenting, on the ground that the statute should not be construed to authorize the nuisance, but only to authorize the dam in so far as it could be erected without becoming a nuisance.

††Commonwealth vs. Reed, 10 Casey, 275.

THE GENERAL DOCTRINE OF NUISANCE.

§ 1072. WHAT IS A NUISANCE.—It may be stated, in the first place, that all acts which tend directly to create a sort of general evil to the community at large may be deemed nuisances, when they are of such magnitude as to require the interposition of the judicial tribunals. But, in determining what are such acts, we must look to the adjudications; because justice must travel in a uniform way, while it does not yet bear the burthen of a real equity.

§ 1073. ABATABLE AND INDICTABLE, DISTINGUISHED.—In the next place, the reader should carry in his mind, the distinctions * * * * between nuisance abatable and nuisance indictable. * * § 823. * * "If one see his neighbor erecting a thing which will be a nuisance, he cannot abate it till it becomes an actual nuisance."*

§ 828. ABATABLE NUISANCES. * * Whenever a subject of property comes, whether through the fault of its owner or not, into a situation to be a nuisance, it is not strictly forfeited; but the nuisance may be abated, to the destruction, if necessary, of the property. If the nuisance is a private one, persons whose interests are prejudiced by it may, without resorting to legal proceedings, go upon the ground and abate it;† if a public, it may be abated by any individual,† of the public, that is, by anybody.‡ Yet, as we have seen, it must be in actual existence, not merely prospective. So the person abating must do no more damage than he is obliged to do in accomplishing the object,|| as, for example, if a house is used for purposes, publicly injurious, hc may pull it down, when the injury

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*Rex vs. Wharton, 12 Mod. 510, by Holt, C. J.

†Gates vs. Blincoe, 2 Dana. 158; Moffett vs. Bremer, 1 Greene, Iowa, 348; Lancaster Turnpike vs. Rogers, 2 Barr., 114; Great Falls Co. vs. Norster, 51 N. H. 412; Rex vs. Rosewell, 2 Salk. 459.

‡Renwick vs. Morris, 7 Hill, N. Y., 575; Arundel vs. McCulloch, 10 Mass. 70; Wetmore vs. Tracy, 14 Wend. 250; Hall's Case, 1 Mod. 76; Low vs. Knowlton, 26 Maine, 128.

||Arundel vs. McCulloch, 10 Mass. 70; The State vs. Moffett, 1 Greene, Iowa, 247; Moffett vs. Greene, Iowa 348; James vs. Hayward, W. Jones, 221, 223.

cannot otherwise be arrested;* but, when it can, he must not proceed so far. * * In other words, he may simply abate the nuisance, no more.†

§ 1074. ACTIONABLE AND INDICTABLE, DISTINGUISHED.— * * * Though indictments and civil suits proceed, to a great extent, on different principles, yet there are circumstances in which the indictment differs but little from a civil prosecution, except in being carried on in the name of the public as plaintiff, while an individual merely is the plaintiff in the civil cause. In cases of this particular sort, therefore, the rules which govern the indictment approximate more nearly to those which control civil causes generally, than where the wrongful act is more purely a crime. But it is impossible to state this distinction in the form of an exact rule. The distinction is perhaps better illustrated in the department of nuisances than in any other in the criminal law. "Thus, as observed in a previous section, [§236], if a man goes on his neighbors land and deadens a tree there growing, he exposes himself to a civil suit; if, on pnblic land, to a criminal. Or, if a nuisance affects the public, it is indictable, while actionable if it affects only individuals. But it would be difficult to show the act to be more evil in nature or degree in the latter cases than in the former ones."

§ 1079. MISDEMEANOR—PUNISHMENT—ABATEMENT BY JUDICIAL ORDER.—We need hardly say, that nuisance at the common law is misdemeanor, in distinction from felony; punishable, therefore, at common law, by fine and imprisonment. Hawkins adds: "It is said, that one convicted of a nuisance done to the king's highway may be commanded by the judgment to remove the nuisance at his own costs; and it seemeth to be reasonable that those who are convicted of any other common nuisance should also have the like judgment."* This order for abatement is not a necessary part of the judgment, nor is it strictly in the nature of punishment. If the defendant has abated the nuisance, it is to be taken into the account in his favor.† So also may be the fact that he acted only as an agent for another.‡ But the reader need not be told, that such considerations are only in mitigation of punishment, not entitling the defendant to an acquittal.

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*Meeker vs· Van Renselaer, 12 Wend. 397.

†, Welch vs. Stowell, 2 Doug. Mich. 332; Barclay vs. Commonwealth, 1 Casey 503.

§ 1080. * * * If a dog becomes ferocious and dangerous to the public, he is, therefore, a public nuisance, and any one may kill him.

§ 1081. But the general right to abate even a public nuisance has its limits, though it may not be easy to state exactly what the limits are. Thus we have seen that the person abating it should not do needless damage. And it was laid down in a Maryland case, that, in the language of Le Grand, C. J., "the right to abate a public nuisance belongs to every citizen, yet it cannot be lawfully exercised if its exercise involve a breach of the peace. When such is the case, the party erecting the nuisance must be proceeded against legally." It will undoubtedly, in some circumstances, lend strength to the right of abating a public nuisance that the person abating suffers a special injury from it, because this fact will authorize even the abatement of a private nuisance;‖ yet, when the nuisance is clearly public, it is not, as a general proposition, essential that the person abating should be a special sufferer from the thing abated.

§ 1082. MUNICIPAL CORPORATION NEGLECTING TO ABATE NUISANCE.—An indictment may be maintained against a municipal corporation which has, under its charter, power to enact ordinances necessary to preserve the public health and remove nuisances, if it does not cause to be abated a public nuisance, like a slaughter house, kept, to the detriment of the public health, on land of an inhabitant within the corporate limits.*

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*1 Hawk, P. C. Curw. ed. p. 695, § 14, 15.

†Reg. vs. Macmichael, 8 Car. and P. 755. See also Rex vs. Grey, 2 Keny, 307; Rex vs. Green, 1 Keny. 397.

‡The State vs. Bell, 5 Port. 365.

‖Gates vs. Blincoe, 2 Dana., 158. The assent of a party to a nuisance will not take away hjs right to abate it afterward, if he thinks proper. Pilcher vs. Hart, 1 Humph. 524.

§ 419. Thus, towns and parishes, being corporations of a particular kind, are indictable for nuisance in not repairing the highways and bridges which their duty requires them to repair.† So also are railroad‡ and turnpike companies.|| And, generally, when the law casts upon any corporation an obligation of such a nature that the neglect of it would be indictable in an individual, the corporation neglecting it may be indicted."§

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*The State vs. Shelbyville, 4 Sneed, 176; McKinney, J. observing: "By the act of the General Assembly incorporating the town of Shelbyville it is expressly declared, that said corporation shall have full power and authority to enact all such laws and ordinances as may be necessary and proper 'to preserve the health of the town, prevent and remove nuisances,' etc. Session acts of 1819, C. 16, § 2. Under this provision of the charter, there can be no doubt, as to the power of the corporation to prevent or to 'remove' the nuisance charged in the indictment; nor can there be any more doubt as to the positive duty of the corporation to exercise this power in all proper cases. The existance of such a power is indispensable to the public health; and the corporation is not at liberty to decline its exercise when demanded by the public interest. An indictment against the corporation is the proper mode of redress, by the public for a grievance of this nature."

†Grant on Corp. 283; The State vs. Barksdale, 5 Humph. 154; The State vs. Mayor and Aldermen of Murfreesboro, 11 Humph. 217; Rex vs. Hendon, 4 B. and Ad. 628. See Smoot vs. Mayor, 24 Ala. 112.

‡Reg. vs. Birmingham and Gloucester Railway, 2 Gale and D. 236, 9 Car. and P. 469, 6 Jur. 804, Q. B. 223.

||Waterford and Whitehall Turnpike vs. People, 9 Barb. 161.

§See the citations in the last note, also Grant on Corporations, 283; People vs. Albany, 11 Wend. 539; Lyme Regis vs. Henley, 3 B. and Ad., 77, 92, 93; Angel and Ames corp. § 394. And see Reg. vs. Birmingham and Gloucester Railway, 1 Gale and D. 457, 5 Jur. 40.

V. STATUTES OF WISCONSIN, RELATING TO PUBLIC HEALTH.

But few of the general statutes of the State have a direct bearing on the Health Department of Milwaukee. The first clause of section 1408, Chapter LVI, of the Revised Statutes, provides that the State Board of Health and Vital Statistics, "shall have charge of all matters pertaining to quarantine." Perhaps the authority of the Commissioner of Health, of Milwaukee, is thereby superceded, so far as local quarantine is concerned. If so, the law should be speedily amended. The Commissioner might learn of the near approach to Milwaukee harbor of a vessel containing persons afflicted with a contagious or infectious disease, and would be powerless to protect the people of the city, if he had to wait for the notification and action of the State Board of Health, the executive members of which might live at a distance. The Health authority of Milwaukee should at least have the power to act temporarily. Or the State Board might be empowered to authorize the Milwaukee Commissioner of Health to act as local quarantine officer under their direction. The further power conferred on the State Board, to "make general or local rules and regulations for the preservation or improvement of the public health, not inconsistent with law, or those prescribed by local authorities pursuant to law," is not likely to bring the Board into conflict with the Health Department of this city.

Chapter LVII, of the Revised Statutes, entitled "Of the preservation of the Public Health," provides for Local Boards of Health, "when not otherwise provided in city or village charters," and confers upon such Boards ample powers, and prescribes their duties. This chapter of statutory law on the subject of the public health is a model of its kind and shows the enlightened spirit of the people of our commonwealth.

Chapter LVIII provides for the organization of local medical societies, designating who may become members, conferring upon them certain powers, and prescribing the duties of their officers. It also contiuues the existence of the State Medical Society, "heretofore incorporated," "with the general powers of a corporation;" and with such powers "as are conferred by this chapter." Next to the last section of this chapter of the Revised Statutes is very significant and may have an important local application in the near future.

Quacks not to recover fees or testify as experts.

SECTION 1436. No person practicing physic or surgery, or both, shall have the right to collect in any action in any court, fees or compensation for the performance of any medical or surgical service, or to testify in a professional capacity as a physician or surgeon in any case, unless he shall have received a diploma from some incorporated medical society or college, or shall be a member of the state or some county medical society legally organized in this state.

OF OFFENCES AGAINST THE PUBLIC HEALTH.

Chapter CLXXXVII of the Revised Statutes, entitled as above, contains important provisions, most of which are confirmatory of the Common Law, as given in the preceding pages, and is here copied entire.

Penalty for selling unwholesome provisions.

SECTION 4599. Any person who shall knowingly sell any kind of diseased, corrupted or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, shall be punished by imprisonment in the county jail not more than six months, or by fine not exceeding one hundred dollars.

For adulterating food, liquors, candies, etc.

SEC. 4600. Any person who shall fraudulently adulterate, for the purpose of sale, any substance intended for food, or any wine, spirits, malt liquor, or other spirituous liquor, or any other fluid, intended for drinking, or any candy or sweetmeat, with any substance, coloring matter, or anything poisonous, deleterious or injurious to health, or who shall knowingly manufacture, sell or offer for sale, any such adulterated food, liquor, candy or sweetmeat, shall be punished by imprisonment in the county jail, not more than six months, or by fine not exceeding one hundred dollars, and any article so adulterated shall be forfeited and destroyed.

For adulterating drugs and medicines.

SEC. 4601. Any person who shall fraudulently adulterate, for the purpose of sale, any drug or medicine, in such a manner, as to render the same injurious to health, shall be punished by imprisonment in the county jail, not more than one year, or by fine not exceeding three hundred dollars.

For inoculating with the small-pox.

SEC. 4602. Any person who shall inoculate himself or any other person, or shall suffer himself to be inoculated, with the small-pox, within this State, with the intent to cause the prevalence or spread of such infectious disease, shall be punished by imprisonment in the state prison, not more than three years, nor less than one year.

Penalty on drunken Physician prescribing

SEC. 4603. Any physician or other person, while in a state of intoxication, who shall prescribe any poison drug or medicine, to another person, shall be punished by imprisonment in the county jail, not more than one year, or by fine not exceeding one hundred dollars.

Penalty for depositing poison.

SEC. 4604. Any person who shall deposit any poison or poisonous substance, upon the lands or in the building of another person, with intent to injure any person, shall be punished by imprisonment in the county jail, not more than ninety days, or by fine not exceeding fifty dollars.

Permitting diseased animals to run at large, punished.

SEC. 4605. Any person who shall suffer to run at large, or who shall keep in any place where other animals can have access to or be infected by them, any horse, mare, mule, ass, ox, bull, cow, sheep, or other domestic animal, owned by him, or in his care or possession, and known by him to be affected by glanders, farcy, or other infectious and contagious disease, or who shall bring into, or own or have in his possession in this State any diseased Cherokee or Texas cattle, shall be punished by imprisonment in the county jail, not more than one year, or by fine not exceeding two hundred dollars.

Penalty for coloring grain.

SEC. 4606. Any person who shall fumigate any barley, wheat or other grain, by the use of sulphur or other substance, or shall in any way, or by the use of any chemical material or process, affect the color or healthfulness of such grain, or who shall sell or offer for sale any such grain, knowing that the same has been so fumigated, or the color or healthfulness thereof so affected, shall be punished by imprisonment in the county jail, not more than one month, or by fine not exceeding fifty dollars.

Penalties for selling to factories impure milk.

SEC. 4607. Any person who shall knowingly sell, supply or bring to be manufactured to any butter or cheese factory, or to any person to be used in the manufacture of butter or cheese, or to be used in any other manner, any milk drawn from a cow, not in a proper condition of health, or too near, either before or after, the time of calving, or any milk which is adulterated by any deleterious, or contaminated by any filthy substance, or any milk which has been skimmed, or with the strippings left out of it, or that has been diluted with water, or colored by any substance, or which has become filthy by careless milking or handling, or tainted or partly sour for want of proper care in keeping pails, strainers, or any vessels in which said milk is kept, clean and sweet, shall be punished by imprisonment in the county jail, not more than thirty days, or by fine not exceeding one hundred dollars.

Violating orders of Board of Health, punished.

SEC. 4608. Any person who shall wilfully violate any law relating to the public health, or any order or regulation of any Board of Health, lawfully made and duly published, shall be punished by imprisonment in the county jail, not more than three months, or by fine not exceeding one hundred dollars.

OF ACTIONS FOR PRIVATE NUISANCES.

All but the last section of chapter CXXXVII, of the Revised Statutes, is here copied, because its provisions must guide the Commissioner of Health in giving advice to citizens who come to consult him in regard to the proper mode of seeking redress on account of nuisances that are rather private than public.

Jurisdiction of Circuit Courts.

SECTION 3180. The Circuit Courts have jurisdiction of actions to recover damages for and to abate private nuisances, or a public nuisance from which any person suffers a private or special injury, peculiar to himself, so far as necessary to protect the rights of such, and to grant injunctions to prevent the same.

Judgment.

SEC. 3181. In such actions, when the plaintiff prevails, he shall, in addition to the usual judgment for damages and costs, also have judgment that the nuisance be abated and removed, unless the court in which such action shall be tried, shall certify, in the minutes of such trial, that the abatement thereof is unnecessary.

Execution and warrant to issue.

SEC. 3182. In case of judgment that the nuisance be abated and removed, the plaintiff shall have execution in the common form for his damages and costs, and a separate warrant to the proper officer, requiring him to abate and remove the nuisance at the expense of the defendant.

Warrant may be stayed.

SEC. 3183. The court may, on the application of the defendant, order a stay of such warrant, for such time as may be necessary, not exceeding six months, to give him an opportunity to remove the nuisance, upon his giving satisfactory security to do so within the time specified in the order.

Expense of abatement, how collected.

SEC. 3184. The expense of abating and removing such nuisance pursuant to such warrant shall be collected by the officer in the same manner as damages and costs are collected upon execution; and such officer may sell any material of any fences, buildings or other things, abated or removed as a nuisance, in the same manner as personal property is sold upon execution, and apply the proceeds of sale to pay the expenses of such abatement and removal, paying the residue, if any, to the defendant on demand, and if insufficient to pay such expenses, he shall collect the residue as above provided.

SEWERS, SEWAGE AND SEWER-GAS.

> "It has long been the most fixed of the certainties which have relation to civilized life, that, wherever human population resides, the population cannot possibly be healthy, cannot possibly escape recurrent pestilential diseases, unless the inhabited area be made subject to such skilled arrangements as shall keep it habitually free from the excrements of the population."—Simon.

SEWERS, SEWAGE AND SEWER-GAS.*

Long before sanitary science had taken the form of public hygiene, Dr. Benjamin Rush, the sharpest medical observer and the profoundest medical thinker produced by America, came to the conclusion that the means of preventing pestilential fevers "are as much under the power of human reason and industry as preventing the evils of lightning and common fire. I am so satisfied of this opinion, that I look for a time when our courts of law shall punish cities and villages for permitting any of the sources of bilious and malignant fevers to exist within their jurisdiction."

If Milwaukee were required to use the means of shielding herself against the legal liabilities indicated in the comprehensive words of Dr. Rush, she would be obliged to undertake and complete many vast public improvements.

1. In order to prevent bilious fevers, or fevers of malarial origin, it would be necessary to carry out a complete system of agricultural drainage, removing from the surface and from the soil to a depth below the foundations of all buildings water that falls from the heavens or springs from the earth. Security from dampness and stagnant water is not only security from malarial fevers, but also in a great measure from consumption, scrofula, rheumatism, and various

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*The greater portion of this chapter consists of a report to the Common Council, under date of August 24, 1878, in response to the following:

"Resolved, By the Common Council, that the Commissioner of Health be, and he is hereby instructed to examine into the system of house drainage and sewerage in this city, and to report how sewer-gas can be kept out of houses connected with sewers, and also what effect the emptying of sewage into the river has on the sanitary condition of the city and how the evil effects thereof can be averted."

other diseases. Complete aeration of the soil to the depth of eight or ten feet by efficient under-drainage enables the earth to oxidize, and thus disinfect a vast amount of polluting matter thrown upon it, increases its temperature, and removes from it the poisons that cause ague and bilious fever, that either produce or intensify scrofula, tuberculosis, catarrh, bronchitis and pneumonia; that aid to spread and render more fatal small-pox, scarlatina, diphtheria and other contagious diseases; that gather to our cemeteries a more abundant annual harvest of the old, the young and the feeble. "I feel assured," says Mr. Denton, "that as certainly as we of this generation are now engaged in removing from our rivers the polluting matters which the authorities of the last generation obliged our fathers to discharge into them, so will those who come after us lament with shame, and do their best to repair, the disregard paid by our present authorities to the drying of the sites of habitations as one of the first considerations for the preservation of human life."*

2. In order to prevent malignant fevers, or fevers of the typhoid type, it would be necessary to remove from the city all organic matter and animal excreta before undergoing putrefactive change. It would be necessary to carry away to some safe locality the contents of 15,000 privy-vaults; to exhume from the abused earth and remove the buried contents of as many more; to prohibit the establishment of cow-yards and hog-pens in the city; to require

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*A case mentioned by Pettenkofer, (quoted by Kirchner, Lehrb. der Mil-Hygiene, 1869. pp. 217, 218) is very striking as to the effect of subsoil drainage on some kind of fever in horses. Two royal stables near Munich, with the same arrangements as to stalls, and attendance, and the same class of horses, suffered very unequally from fever; horses sent from the unhealthy to the healthy stables did not communicate the disease. The difference between the two places was, that in the healthy stables the ground water was five to six feet, in the unhealthy 2½, feet from the surface. Draining the latter stables, and reducing the ground water to the same height, made these stables as healthy as the others.—Dr. Parkes, Practical Hygiene, 1878, p. 333.

At Boufaric, in Algeria, successive races of soldiers and colonists had died off, and the station had the worst reputation. Deep drainage was resorted to, the level of the ground water was lowered less than two feet. This measure, and a better supply of drinking water, have reduced the mortality to one-third.—Ibid. p. 332.

Many pages of testimony, from the highest hygiene authorities, might be quoted, as to the improvement of the sanitary condition of any region by subsoil drainage.

the owners of horses to keep their stable refuse under cover and remove it without allowing it to touch the ground; to clean all streets and alleys every week and the main thoroughfares every day; to subject street sweepings to the action of fire in order to consume the 40 or 50 per cent. of organic matter, before using the same for filling; to establish a system of sewerage that should carry off all house slops and human excreta before they could have time to undergo putrefactive fermentation; to banish from the city slaughter houses and the "offensive trades"; to teach the people to burn every day the solid portions of garbage, unless interested persons should collect the same in an inoffensive manner without cost; to require that all privy-vaults wherever the public water-works extend, shall be cleaned, disinfected, and filled with earth, and that all privy-vaults, in other localities, shall be lined with an impervious layer of hydraulic cement, be constantly sweetened with fresh lime, and cleaned at least once a year; to make provisions for pumping away the sewage to a great field of thoroughly under-drained and aerated ground where it might contribute to the growth of useful plants and undergo purification; to regulate the drainage of our houses in such a manner as to prevent the ingress of sewer-gas; to protect the rivers running through the city from the contamination of any foul matter; to close up wells that from any cause have become impure; to furnish all citizens with clean water for domestic use; to prevent the sale and consumption of unwholesome foods and drinks; in short, to subject the city to such sanitary regulations as the established principles of public hygiene require.

These general outlines, hastily drawn, seem necessary in order to place in proper relations the particular subjects on which we are seeking information. And it is not worth while to strive towards a standard lower than that established by exact science.

SEWER-GAS.

That peculiar organic vapor generated by the putrefactive fermentation of animal excreta is not very well understood by chemists. At Paris, the gas which bubbles up from the sewage-beds in the bottom of the river Seine has been found to contain in one hundred parts—

Carburetted hydrogen	72.88
Carbonic acid	12.30
Oxide of Carbon	2.54
Sulphuric acid	6.70
Other substances	5.58

But the chemical composition of sewer-gas does not fully indicate its deleterious nature. It is not only a poison in itself but is also known to be a vehicle for conveying the disease-germs of typhoid fever, small-pox, scarlatina, diphtheria, and other contagious and infectious maladies. It is less obvious to the senses than sulphuretted hydrogen, but in small quantities is more deleterious in its effects.

How to keep this poisonous gas out of buildings connected with public sewers is a problem that interests a large number of people in this city. "An old-fashioned sewer," says Geo. E. Waring, a very high authority in sanitary engineering, "has been well called a retort for the manufacture of sewer poisons which are 'laid on' at every house by an ingenious system of pipes delivering an intermittent supply through every water-closet, bath-tub, and wash-basin, and producing its annual crop of zymotic diseases." "It is very well," says Dr. Sandwith, "to boast of traps and of similar mechanical arrangements, but remember there is such a thing as corrosion of metals, and the smallest defect, no larger than the interior of a straw, may introduce into your houses vast volumes of gas." As I said to the people of Milwaukee six or seven years ago, in a carefully prepared newspaper article, sewer-gas acts as a mordant and is apt to bite through thin lead waste-pipes, especially on the upper side. The British Medical Journal, speaking of very careful investigations made by Dr. James B. Russell, the Medical Officer of Health for Glasgow, says: "Thus it seems to be proved that in Glasgow, during these three years and a half, the lowest death-rates from diphtheria and enteric fever occurred in those houses of one and two apartments having no communication with the sewers; while the highest rates were found in those houses of two apartments which were provided with water-closets and sinks. The mortality from each of these diseases was, however, found to be still higher in houses of three apartments; but, as the proportion of this class of houses provided with sewer communications is unknown to Dr. Russell, he was unable to deal with their statistics so completely as he did with those of one and two apartments. As, however, the proportion of internal sewer communications rose from 33 per cent. in the houses of one apartment to 69 per cent. in the houses of two apartments, it is only reasonable to assume that three and four apartment houses are still more fully provided with internal sewer communications. Hence, probably, the still higher death-rate from these diseases, the specific germs of which conclusively appear to be distributed by sewer-gas." As Dr. Sandwith again says: "If you have a case of typhoid fever a mile off, who knows but you may have the mysterious fungoid organism conveyed into your own house through the water-closet."

From all of which the prudent householder may conclude that his family is safer without the connection with the public sewers. His conclusion is unquestionably correct, unless he has the intelligence to find and the means to pay for the services of an architect, a builder and a plumber, who know enough to construct a "modern" house without filling it and poisoning it with sewer-gas.*

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*Dr. Parkes, and there is no greater authority in sanitary matters, enumerates and answers the main objections to sewers, as follows:

"1. That as underground channels, connecting houses, they allow transference of effluvia from place to place. The objection is based on good evidence but it must be said in reply that, if proper traps are put down, and if air-disconnection, in addition, is made between the outside drains and the house pipe, such transference is impossible. The objection is really against an error of construction, and not against the plan as properly carried out. Besides, the objection is equally good against any kind of sewer, and yet such underground conduits are indispensable.

"2. That the pipes break and contaminate the ground. This is a great evil, and it requires care to avoid it. But such strong pipes are now made, that if builders would be more careful to make a good bed, and to connect the joints firmly, there would be no leakage, as far as the pipe drains are concerned, and not much damage of the main brick sewers. At great depths, also, the pressure of the soil water will rather cause entry than exit from the sewers.

"3. That the water supply is constantly in danger of contamination. This also is true, and as long as overflow pipes from cisterns are carried into sewers, and builders will not take care to make a complete separation between water

HOW TO KEEP IT OUT.

A water-trap is almost universally relied upon to prevent the ingress of poisonous vapors from the sewers through drain-pipes into houses. Such "traps" are only a delusion and a snare. The water in them is by no means an effective barrier against the dreaded gas. Every boy who blows through a straw into a tumbler of water knows that his breath bubbles up from the bottom of the glass. When, from any cause, the pressure of the air is less inside the house than it is in the sewer, it will pass in through the trap almost without obstruction. A sudden fall of rain, filling the sewers, causes pressure of the gases therein and forces them through water-traps into our habitations. If sewers empty into tide-water or a river, the rise of water compresses the gaseous contents and drives them through the feeble obstruction into the living-rooms of houses. The fall of temperature at night, especially during the colder part of the year, produces a greater contraction of air in the dwelling than in the underground sewer, which causes a slow but continuous ingress of the invisible enemy. Draught of the chimney, sucking-in air to feed the cheerful fire in winter, when all the doors are closed, also sucks in the sewer-gas, through the inverted syphon filled with a slender column of water below the wash-bowl. Moreover, it is a well-known chemical fact that liquids absorb and transmit gasses. Recent experiments at Glasgow and New York prove that sewer-gas passes abundantly through the water in a trap, even when there is no outside pressure or inside suction to help it along. Besides, every time water is thrown down through a waste-pipe, syphon action is liable to empty the trap entirely, leaving, perhaps for hours, a free aperture from the foul sewers into that portion of the house most used. If the wash-basin or water-closet is not used for a day or two, the water in the trap will evaporate and thus open the door to the subtle fiend. Bad workmanship may leave an open joint, decay may make a fissure, accident may cause a slight break, through which this ever-

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pipes and refuse pipes, there is a source of danger. But this is again clearly an error in constructive detail, and is no argument against a proper arrangement." —Practical Hygiene, 1878, p. 386.

present ally of disease and death may steal its way to the innermost recesses of our homes and cause them to be draped with mourning.

THE FIRST REQUISITE

to guard against the ingress of sewer-gas is good material and faithful workmanship. Then a safe egress must be made for the "viewless" fiend. Send him elsewhere. Outwit him by giving him an escape into outer air. This can only be done by complete ventilation of the whole house drainage system. The soil-pipe, instead of having a closed termination within the house, must run up through the roof and the end be left open in the upper air. A "hood" may be placed above it, giving it a draught, like a chimney. The ascending gas can then not only find its way out, but it will be drawn out. It is well to speed the parting of the unwelcome and the unwholesome guest. Wherever there is a smaller waste-pipe or soil-pipe in the house, leading from a water-closet, bath-tub, sink, or wash-bowl, a ventilating pipe should be carried from below the trap into the main soil-pipe running to an open termination above the roof already described. These smaller ventilating pipes not only draw off the sewer-gas in the smaller waste-pipes and soil-pipes, but also prevent syphon suction from emptying the traps. The house-drain should lead to the public sewer through a trap. And above this trap a ventilating pipe, outside of the house, should be carried up above the highest windows. There will then be a perfect circulation of air from the outside ventilating-pipe through the soil-pipe, ascending above the roof.

Ventilating pipes have sometimes been carried into chimney flues. This is wrong, for often there is a down draught through the chimney at night, caused by the cooling and consequent contraction of the air within, which would bring the gas directly into the living-rooms of the house. The roof-leaders have sometimes been used as ventilating pipes outside. This is wrong again, for the roof-leaders may be filled by failing rain just when the compressed gas in the sewers, flushed from the same cause, is escaping most freely.

"In the very complete sewerage work of Croydon," says Colonel Waring, "Dr. Carpenter early insisted upon the compulsory ventilation of soil-pipes, but his opinion and his advice had to be reinforced by a long list of deaths traceable to the lack of ventilation, before the authorities adopted the rule. The work was systematically carried out by Mr. Latham, who was then a director of the Croydon board, and who has since become a leading authority in matters of sanitary engineering. Although he had himself given full credence to Dr. Carpenter's belief, he was astonished at the result. 'Typhoid was sprinkled here and there before him; but as the work progressed it entirely disappeared from behind him and has not returned.' "

WORSE THAN A CORPSE IN A HOUSE.

In nine out of ten, probably in ninety-nine out of a hundred, houses in this city connected with the public sewers, the gas in question is a perpetual guest. Like the traditional ghost, it comes through closed doors. It does not go when it is ready, but comes to stay. Nothing but the subtle cunning of science can bar its ingress. It is worse than the skeleton that is said to be in every man's closet. It is more unwholesome than a rotten corpse. The cadaver might be enclosed in a single room. The poisonous gas is everywhere. The effluvium of the corpse does not lie in ambush. The gas comes from the organic decay of the whole neighborhood. To-day it brings with it the contagion of typhoid; to-morrow it introduces diphtheria; next day it smuggles in scarlatina. It gives no warning, and its unknown presence is not shunned. It sleeps with you, creeps into every cell of your lungs, and lays shadowy fingers on every drop of your heart's blood. "Animal matter," says Dr. Robert Angus Smith, "which chiefly is found to be dangerous, is, in fact, the fæces or dejecta of human beings and of cattle. It might be supposed that these substances had already been decomposed, but such is not the case. The decomposition is very imperfect, and, when they are allowed to stand, putrefaction sets in, closely allied to, perhaps exactly the same, as that which takes place in other animal matters, such as blood, or in a mixture of flesh and water. When these substances decompose, the result is, so far as we know, nearly the same as the decomposition of the entire animal body. We are not able to tell the difference between the products of putrefaction from our cess-pools and those from our grave-yards." Excreta are the wastes of the body and in decay more dangerous than the body itself. Sewer-gas, the product of the putrefactive fermentation of excreta, is more poisonous than the effluvium of a decomposing dead body; it is therefore more perilous in the house than the perpetual presence of a corpse.

PROPER MATERIAL FOR SOIL-PIPES.

As declared by the New York Board of Health, "The best material for all drain-pipes is iron. Every joint should be thoroughly secured and caulked with molten lead." Waste-pipes of lead which are commonly put in by plumbers, should never be used. Sewer-gas will eat through them. Dr. Fergus, of Glasgow, a sanitarian of great experience and high repute, says: "Lead has generally been used as the material for soil-pipes, and as we have seen how capable it is of corrosion, it becomes a very important sanitary question to inquire how long a good lead soil-pipe will hold out. I have been studying this question for years, and it is now about seven years since I first exhibited decayed pipes in public, yet I would not wish to dogmatize on the subject, but rather give approximations, and would remark that the time will vary under various circumstances according to the strength and rapidity of the flow of the sewage, as well as the original thickness of the pipe. But after allowing for this, we must broadly distinguish between soil-pipes which are ventilated and those which are not. By the former, I mean when the pipe is carried up to the roof of the house and open to the external air; by the latter, I mean when the pipes are closed up. Of these last mentioned, the duration may be stated to be about twelve years, the extremes of variation being from a minimum of eight to a maximum of twenty years. In ventilated pipes the duration may be stated to be nearly double, running from twenty-one to thirty-three years, the extremes of variation being from eighteen to thirty or even more years. The practical sanitary conclusion which it concerns us all to keep in mind is, that any house, no matter how carefully or well built, may become unhealthy from this source, and that when cases of typhoid fever, diphtheria, etc., occur, the pipes should be thoroughly inspected, especially their upper surface, and the whole of the soil-pipe uncovered. I must strongly insist on this, as in many cases the plumbers have declared pipes to be all right, which turned out to be very defective when uncovered. For some years back, I have insisted on a careful examination of the soil-pipes whenever I have cases of typhoid or diphtheria, and in every case where I could get this carefully carried out, I have detected these perforated pipes, or sewer-air getting into the houses in some other way."

SHOULD VENTILATION OF SOIL-PIPES BE COMPULSORY?

The spirit of our institutions is in favor of personal liberty. The public authority, or the governing agency, should not interfere with private rights. It is a belief entertained by many, that a man has a right to do what he pleases on his own premises. This doctrine, in order to be tenable, must always be qualified by the further proposition that a man has a right to do on his own premises, or elsewhere, what he pleases, provided he pleases to do nothing injurious to others. He cannot do what violates the rights of others, simply because he does it on his own premises. For example, no man has a right to store gunpowder in his kitchen. He has no right to undress before an open window of his house looking out towards his neighbors. He has no right to allow accumulations of human or animal ordure on his premises, to the sanitary detriment of the public. He has no right to kill his own child because he does it in his own house. Neither has he a right to endanger his own household and perhaps set up a center of contagious or infectious disease, by neglecting or willfully refusing to employ the proper means to keep poisonous sewer-gas out of his house. The public agency has a right to forbid him the use of public sewers, unless he will conform to regulations manifestly for his own as well as the public good. The caprice of the individual must be subjected to the well-being of the whole. He who intelligently demands personal liberty for himself respects it in all. Freedom and obediance to just law, properly temporing each other, constitute enlightened liberty.

Civic authorities, in all civilized countries, have imposed regulations for the general good. Cities, therefore, fix fire limits for the general safety. They regulate the sale of intoxicating drinks by requiring licenses. Here and elsewhere, conditions are imposed on the use of public water. There is no reason why regulations for the use of public sewers should not embrace a requisition to ventilate soil-pipes in the houses of individuals. Such a requisition is rigidly enforced in various cities of Germany and England. There is no reason why it should not be enforced here. No man has a right to poison his wife and children with sewer-gas, any more than he has to feed them with diseased or putrid meat.

Therefore I recommend the Common Council of this City to pass a carefully drawn ordinance, requiring every citizen who is permitted to connect his house with the public sewers to comply with regulations that shall secure his household against unsanitary conditions. Most admirable are the conditions required by the authorities of Frankfort-on-the-Main, under which, buildings, yards, gardens, etc., are allowed to be drained into the new sewerage system. Complete plans must be furnished by the owners of property, a duplicate copy of which is kept among the documents of the sewer department. The plans presented must contain all the works projected. Excellent from a sanitary point of view is the requirement that "all drains are to be so arranged as to accomplish the most complete drainage practicable of the buildings and grounds." The method of drainage and the materials to be used must be approved by the sewer department. Tarred iron pipes, lead-jointed, are recommended as the most durable and safest, and, in and near the houses, must be everywhere used as described. Earthenware pipes are permitted, but within the house they must be encircled with a layer of concrete at least ten centimeters thick. All drains must be jointed water-tight. Drains must be shut off by flap-valves, which can be screwed down securely, whenever there is danger of a back flow when the sewers are unusually full. Rain-water spouts must be carried underground into the sewers, and must be of iron with cemented joints. All pipes must have a fall of one in twenty, except by special permission and with provision for abundant flushing. Cisterns for rain-water must be made with overflows dipping below the surface of the water and secured by syphon-traps. Fluid substances from houses, yards, passage-ways, etc., are not allowed to run into the public streets, but must be carried underground into the sewers. Immediately after completion of a house-drainage system, all vaults must be emptied and filled with earth. The connection of any water-closet can be permitted only when the water-supply is sufficient to completely flush all matters through the local drains into the sewers. Exactly to the point under discussion is the regulation that "the vertical soil-pipes of all water-closets, even if small in diameter, must be carried up above the roof and beyond all windows, for the sake of ventilation." These and many other admirable regulations, to the number of 25, are required of every person to whom permission is given to use the public sewers. The authorities imported an English engineer, Mr. W. Lindley, who in co-operation with Dr. G. Varrentrapp, worked out for Frankfort-on-the-Main the finest sewerage system to be found in any city of the world. Dusseldorf, Crefeld, Basel, Stuttgard, Heilbronn, Munich and Hanau, have followed the splendid example. I especially recommend the regulations, briefly summarized above, to the attention of our Commissioners of Public Works and respectfully request the Common Council to confer on the Board any further powers needed to carry them into practice. A suitable inspector, conversant with the builders' profession and the plumbers' art, connected with the Department of Health, should co-operate with the Board of Works in carrying out a reform of this kind, which would sensibly decrease the sick list and death rate of our fair city. The cost to the public treasury would be but a few hundred dollars per annum. Owners of property would be more than compensated for the additional cost of "doing well what it is worth while to do at all," by the increased security of their households, by the greater comfort of living in an atmosphere free from sewer poison, by diminished doctors' and undertakers' bills, by the enhanced value of their homesteads. If new houses were built under such guaranties of sanitary safety, they would be sought for by tenants in preference to all others, at a higher rent.

EMPTYING OF SEWAGE INTO THE RIVERS.

It is important to enquire, "what effect the emptying of sewage into the rivers has on the sanitary condition of the city and how the evil effects thereof can be averted." The subject is closely allied with the former, already discussed, and naturally grows out of it. Our system of sewerage is an intermediary link in the same chain, which I willingly omit, because its consideration belongs to the city engineer. I may remark, in passing, that no city on the western continent is more favorably situated for water-drainage than ours, and at the same time more unfavorably situated for getting rid of sewage without danger to the public health. Nowhere in this country has a double sewerage system been adopted. Milwaukee is especially well located for such a system. Four elevations, sloping to intervening valleys traversed by rivers or to the lake, might have been under-drained, and the surface water carried off, without polluting the streams, provided the earth had been kept clean by wholesome sanitary regulations. Then a separate sewerage system introduced simultaneously with the public water-works, might have carried all the organic refuse of our habitations away to safe and proper reservoirs, whence it might have been pumped to fields outside of the city for disinfection by prepared soil. "Dr. Edward Frankland," says J. Bailey Denton, (the first sanitary chemist and the first sanitary engineer of England), "after making numerous laboratory experiments, declared as the result of his investigation, that the sewage of 3300, or say 3000 persons might be cleansed by intermittent filtration through one acre of suitable land drained six feet deep, but that the process would, he thought, be open to certain objections. My long connection with agricultural works of all kinds enabled me to appreciate Dr. Frankland's theory. I suggested as the means of overcoming the objections anticipated, and in order to secure an undoubted permanency of effect and continued freedom from everything like nuisance, that instead of using the same land for filtration one year after another, it should be used every third year, so as to give two years' rest. It is true that this rotation necessitates the use of three acres instead of one for 3300 persons, i. e., one acre for 1100 persons; but the increase of quantity still leaves the process the simplest and cheapest mode of purifying sewage hitherto known.*

Such a double system would have been no more expensive than the present system, which has been carried too far to retrace our steps. Unfortunately our sewers empty directly into the rivers which traverse the city. At least one hundred tons of human and animal excreta, to say nothing of other putrescible organic matters, are emptied into these sluggish streams every day. Their waters are dark with filth, and yet the question is asked whether they are unhealthy. If a thick solution of ordure is unhealthy, the Milwaukee and Menomonee rivers are certainly so. Passing vessels stir up the sewage from the bottom, making an intolerable stench. It costs the city $20,000 a year to dredge out the rivers and keep navigation open. The dredges stir up "a villanous compound of all stinks," which are not only destructive of comfort but poisonous to those who are compelled to inhale them.

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*Objections have been made by some eminent sanitarians to sewage irrigation farms, as affecting the public health and public comfort. Dr. Parkes, with his usual sobriety of judgment, sums up the matter thus: "As regards health, it has been alleged that these farms may—1st, Give off effluvia, which may produce enteric fever, or dysentery, or some allied affection; or, 2d, Aid in the spread of entozoic diseases; or, 3d, Make ground swampy and marshy, and may also poison wells, and thus affect health.

"The evidence of Edinburgh, Croydon, Aldershot, Rugby, Worthing, Romford, the Sussex Lunatic Asylum, is very strong against any influence in the production of typhoid by sewage farms' effluvia. On the other hand, Dr. Coulston's record of the outbreak of dysentery in the Cumberland Asylum, is counter evidence of weight, and so is one of the cases noted by Letheby, of typhoid fever outbreak at Copley, when a meadow was irrigated with the brook water containing the sewage of Halifax.

"The negative evidence is, however, so strong as to justify the view that the effluvia from a well-managed sewage farm do not produce typhoid fever or dysentery, or any affection of the kind. In a case at Eton, in which some cases of enteric fever were attributed to the effluvia, Dr. Buchanan discovered that the sewer water had been drank; this was more likely to have been the cause.

"With regard to the second point, the spread of entozoic diseases by the carriage of the sewer water to the land, has been thought probable by Cobbold, though as solid excreta from towns have been for some years largely employed as manure, it is doubtful whether the liquid plans would be more dangerous. The special entozoic diseases which, it is feared, might thus arise, are Tapeworms, Roundworms, Trichina, Bilharzia, and Distoma hepaticum in sheep. Cobbold's latest observations show that the embryos of Bilharzia die so rapidly that, even if it were introduced into England, there would be little danger. The trichina disease is only known at present to be produced in men by the worms in the flesh of pigs which is eaten, and it seems doubtful whether pigs receive them from the land. There remain, then, only, Tapeworms and Roundworms for men and Distoma hepaticum for sheep to be dreaded. With regard to these, the evidence at present is negative; and though much weight must be attached to any opinion of Cobbold's, this argument against sewage irrigation must be admitted to want evidence from experience. [Cobbold has since withdrawn his objection.]

"The third criticism appears to be true. The land may become swampy, and the adjacent wells poisoned, and disease, (ague and perhaps diarrhœa and dysentery,) be thus produced. But this is owing to mismanagement, and when a sewage farm is properly arranged it is not damp, and the wells do not suffer."—Practical Hygiene, pp. 374, 386.

HOW FILTH IS DESTROYED.

Incidentally, I have just described the process, largely used in England, of purifying sewage by filtration through aerated land. It is not so much the earth that purifies as the air that it contains. Underdrained land is very porous and contains a large supply of air. In the air with which the pores of the earth are filled there is a superabundance of oxygen. The porous earth acts as a sieve which breaks up the liquid filth into fine particles, bringing it into contact with the oxygen of the contained air. All organic matters are rendered harmless by oxidation. Oxygen is, indeed, the most abundant product of nature. It constitutes about one-half, by weight, of the earth's crust. Sand is more than half oxygen. It constitutes 48 per cent. of limestone. Clay contains 50 per cent. of it. It is 89 per cent. of water, in oceans, rivers, lakes. The atmosphere contains 23 per cent. of oxygen.

If, then, water contains so much larger a percentage of oxygen than air, and organic filth is purified by oxygen, why does not water purify it more rapidly than air? For this simple reason, that oxygen is chemically combined with hydrogen to form water, while it is mechanically combined with nitrogen to form air. In the latter, oxygen is a free agent. In the former, it is combined with something else. Ordinary combustion consists in union with oxygen. Water is burnt hydrogen. Air is simply oxygen diluted with nitrogen. Hence the free oxygen of the atmosphere unites with, or burns, putrescible matters and renders them harmless. Still water makes a "dead bree" of the same matters, instead of giving up its oxygen to burn them. Water when violently agitated, as in turbulent streams, or lakes swept by winds, contains some admixture of air, the free oxygen of which purifies a limited amount of filth thrown in to it.*

And in the air itself, ozone, which, according to Dr. De Chaumont is an intensified oxygen with a greater number of atoms, is probably the most powerful and rapidly destructive agent of putrifying organic matters. "Ozone," he says, "oxidizes (burns, in fact) organic matter with great rapidity, much more rapidly, in fact, than ordinary oxygen. In this way it may be considered the great scavanger of the air."

Hence, the elements of abundant excrementitious and other filth in our sluggish rivers, remain active poisons for a long time, instead of being converted by nature's combustion into stable and harmless oxyds. Sewers may be relieved by letting the noxious gas out in streams above the house roofs, to be burned by the oxygen and ozone of the open air, and may be purified by turning the atmosphere into them. But into the Stygian waters of our polluted rivers the air cannot enter to do its beneficent work, and from their surface perpetually exhales the miasm of disease and death.

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*"When sewer water," says Dr. Parkes, Practical Hygiene, p. 379, "passes into a river, it undergoes considerable purification by subsidence, by the influence of water plants, and in a lesser degree by oxidation. Although some oxidation of nitrogenous organic matters into nitrous and nitric acids and ammonia must take place, it appears from Franklin's experiments, (Reports of the Commissioners appointed to inquire into the pollution of Rivers, 1870, vols. i. ii. and iii.), that in the river Irwell, which receives the sewage of Manchester, after a run of 11 miles, and falling over six weirs, there is no formation of nitrites and nitrates, and there is even an increase in the organic nitrogen (?), though the suspended matters are less (from 2.8 to 1.44 parts per 10,000) than at first. Average London sewage diluted with 9 parts of water and syphoned from one vessel into another so as to represent a flow of 96 and 192 miles, gave a percentage reduction in the organic nitrogen of 28.4 and 33.3 respectively. The oxidation of sewage appears, then, from these experiments, to take place slowly. Dr. Letheby considers, however, that oxidation takes place more rapidly, and that if sewage is mixed with 20 times its bulk of water, and flows for 9 miles, it will be perfectly oxidized. Of course, it is clear that ova, and solid parts of the body, like epithelium, might be totally unchanged for long periods, and we may conclude that oxidation of sewage in running water cannot be depended on for perfect safety."

Sometimes, in a dry season, the sewage of Milwaukee nearly equals the quantity of water flowing in the rivers. If, then, the conclusion of Dr. Letheby that sewage mixed with 20 times its own volume of pure water, and flowing 9 miles, becomes perfectly oxidized, is questionable, there can be no question as to the impurity of our rivers, which are sometimes one-half sewage and flow sluggishly only a couple of miles in the city. Dr. Parkes found unchanged epithelium (an excellent vehicle for carrying cholera, scarlatina, and typhoid fever germs), in unfiltered Thames water after a transit in a barrel of 80 miles, and after keeping for five months.

It would be far better for the city's health if a swamp were in the place of the rivers. The rank vegetation of the swamp would help consume the foul sewage. The influences of vegetation are known to be especially powerful in purifying organic matter in a state of putrefactive decay. "At a recent meeting of the French Horticultural Society," says Col. Waring, "there was a discussion as to the influence of plants on water containing putrefying organic matter; and evidence was adduced to show that while such water left to itself retains its putrescent character, the same water in which roots of growing plants are feeding loses entirely the *bacteria* which accompany putrescence and contains only the larger infusoriæ which are peculiar to wholesome water. It was sufficient to allow a living root to act for five days for the water to lose all its bad smell and to become purified." The reeds, ferns, tamarack shrubs, etc., of a swamp would help transform the excrement of sewage into vegetable tissue and render it comparatively harmless. Snakes, frogs, lizards, mud turtles, etc., things that creep, crawl, swim and walk, would live and flourish in a swamp, but in our fetid rivers animal life does not flourish. The fish sicken and die. Even reptiles shun the lazy-flowing, ordure-laden streams, in which we shamelessly deposit our worst bodily filth, and allow it to putrefy in the light of day, in the heart of our city.

LIABILITY OF MILWAUKEE.

Municipal corporations, like individuals, are liable for damages caused by maintaining nuisances. (Donahue vs. New York, 4 Daly 65. Harper vs. Milwaukee, 30 Wis., 365. Brower vs. Mayor of New York, 3 Barb., 254. Dorman vs. Jacksonville, 13 Fla., 538.) A municipal corporation is liable in damages for discharging its sewers on private property. (O'Brien vs. St. Paul, 18 Minn., 176.) A municipal corporation may prevent and remove a nuisance, but a city government has no authority to sanction or license a nuisance. (Adm'r of Chambers vs. Ohio Life and Trust Ins. Co., 1 Disney,

327. Ryan vs. Capes, 11 Rich., S. C. 1217. Pfau vs. Reynolds, 53 Ill,, 212. Columbus vs. Jacques, 30 Geo., 506. Com. vs. Rush, 14 Pa. st., 186.) Still less has an individual member of a municipal corporation authority to sanction a nuisance. Any individual has a right of action for damages against a municipal corporation for maintaining a public nuisance. (Doolittle vs. Supervisors, 18 N. Y., 155. Thayer vs. Boston, 19 Pick., 291. Hunt vs. Mayor of Albany, 9 Wend., 751. St. John vs. The Mayor, 3 Bosw. N. Y., 483. People vs. Albany, 11 Wend., 539.) The law on this point is settled and there is no need of quoting more authorities. The Milwaukee River from North street to the lake and the Menominee River from Washington avenue to its mouth, are public nuisances, made so by the acts of the municipal corporation of Milwaukee, and damage, in various degrees, many property owners. These property owners may bring suits against the city for private damages, amounting in the aggregate to more than a million of dollars.

Besides, the corporation will be liable to criminal indictment if it does not make reasonable haste to abate the nuisance. "No reason appears," says Bishop, Criminal Law., 418, "why a corporation, having by law the power to act, should not have also by law the power to intend to act; and mere intentional wrong acting is all which is necessary in a class of criminal cases." (The State vs. Barksdale, 5 Humph., 154. The State vs. Mayor and Aldermen of Murfreesboro, 11 Humph., 217. Rex vs. Hendon, 4 B. and Ad., 628.) "When the law," again says Bishop, "casts upon any corporation an obligation of such a nature that the neglect of it would be indictable in an individal, the corporation neglecting it may be indicted." (People vs. Albany, 11 Wend., 539. Lyme Regis vs. Henley, 3 B. Ad., 77, 92, 93.) It is a legal principle universally acknowledged that corporations are indictable for nonfeasance. In case where municipal corporations are not indictable for misfeasance, for the reason that they "have no souls" and are therefore incapable of criminal intent, yet the individuals constituting their government cannot plead such inability and are therefore liable to criminal indictment. If, owing to the practical difficulty of getting service the municipality of Milwaukee could not be indicted for the misfeasance of making the rivers aforesaid a nuisance, yet the men who administered its government when the said nuisance was created could be criminally prosecuted. They could not plead ignorance of the law, for the law allows no man to be ignorant of itself; but they might well plead ignorance of the sanitary fact that emptying sewage into a river may create a nuisance for which the corporation which they misrepresented (it would be needlessly sarcastic to say represented) is liable.

THE REMEDY.

It is a rational conclusion that we must cease to put filth in the rivers if we wish to abate the great and increasing nuisance. The Milwaukee river would be a pure stream, an ornament to the city, if it were not polluted with sewage. The current is not swift enough to float it off. There is no way of increasing the rapidity of the current except by increasing the volume of water. This might be done by pumping from the lake, not otherwise. Making reservoirs higher up on the river, by daming, has been suggested. Letting out such reservoirs would temporarily increase the current, but, on the other hand, the current would be diminished while the reservoirs were being filled. An intermittent flow of water would not be effective. Fresh matter, emptied into sewers from water-closets, will float and pass off in a sluggish current. It very soon becomes saturated with water, when its specific gravity increases to 1.325, and a current of 170 feet in a minute is required to carry it away. At certain seasons of the year the channel of the Milwaukee river receives all the water it can hold, yet the sewage that befouls it is not swept away, and the evil increases from year to year. The question, therefore, of washing out the filth from the open rivers may be dismissed.

Hence it is necessary to devise some plan of removing the sewage without allowing it to reach the streams running through the city. Our sewerage system has proceeded too far to admit of reconstruction. A system might have been devised which would have carried the sewage of the city to the lake, without emptying any of it into the rivers, but it is too late now to retrace our steps, unless we consent to throw away the millions that we have already spent and to begin anew. Dr. Simon, and there is no higher authority on the subject, says: "I accordingly think it an essential principle that the evil of a stinking sewer should always be dealt with at its root. Thus, a sewer which is imperfectly ventilated should have perfect ventilation provided for it; a sewer which, though fairly constructed, is from poorness of current not completely self-scouring, should at due intervals have extrinsic flushing; and sewers which, with radical ill-construction, are virtually but cess-pools under the street, should, without delay, be abolished." If we followed so high a standard, we might be required to do much of our sewer work over, but as this is practically out of the question, the engineering problem is narrowed down to the construction of sufficient intercepting sewers, running parallel with the rivers on each side, receiving and carrying off all the drainage which now empties into the open streams.

How these intercepting sewers shall be constructed, is a problem for the city engineer and the Commissioners of Public Works, and not for the Commissioner of Health. All that I ask is, that such sewers shall improve the sanitary condition of the city and not make it worse.* Without attempting here to discuss the various forms of intercepting sewers that have been proposed, I will content myself with giving the "general conclusions" of the English Board

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*As to the influence the construction of sewers has had on the death rate of towns in England, Dr. Parkes gives a very clear summary of the statistics of Dr. Buchanan and the comments thereon by Mr. Simon in the Ninth Report of the Medical Officer to the Privy Council: "Reference has already been made to the possibility of sewers being the channels by which enteric fevers and cholera have been propagated from house to house, and from which, emanations, causing diarrhœa and other complaints, may arise. Admitting the occasional occurrence of such cases, it remains to be seen whether sanitary advantages of sewers may not greatly counterbalance their defects. * * Dr. Buchanan * * inquired into the total death rate from all causes, and the death rate from some particular diseases, in twenty-five towns before and after sanitary improvements, which consisted principally of better water supply, sewerage, and town conservancy. The general result is to show that these sanitary improvements have resulted in lowering the death rate in nineteen out of twenty-five towns, the average reduction in these nineteen cases being 10.5 per cent. The reduction in typhoid (enteric) fever was extremely marked, and occurred in twenty-one towns of Health, which embody the results of careful investigation by sanitarians and engineers of long experience and great ability:

1. No population living in the midst of aerial impurities arising from the putrid emanations of cess-pools, drains, or sewers of deposit, can be healthy or free from the attacks of devastating epidemics.

2. As a primary condition of salubrity, no ordure refuse can be permitted to remain beneath or near habitations, and by no other means can remedial operations be so conveniently, economically, inoffensively and quickly effected, as by removal of all such refuse dissolved or suspended in water.

3. The general use of large brick sewers has resulted from ignorance or neglect; such sewers being wasteful in construction and repair, and costly, through inefficient efforts to keep them free from deposits.

4. Brick and stone house-drains are false in principle, and wasteful in the cleansing, construction and repair. House drains

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out of twenty-four, the average reduction being 45.4 per cent. in the deaths from typhoid. In three cases there was an augmentation of typhoid fever, but this was manifestly owing to imperfection in the sewerage arrangements; and these cases afford excellent instances of the unfavorable part badly-arranged sewers may play in this direction.

"Diarrhœa has been also reduced, but not to such an extent; and in some towns it has increased, while typhoid fever has simultaneously diminished. * * * Cholera epidemics, Dr. Buchanan considers to have been rendered 'practically harmless.' The immense significance of this statement will be at once appreciated. Whether the result is owing solely to the sewerage or to the improved water-supply, which is generally obtained at the same time, is not certain. * * *

"As far as can be seen, the effect of good sewerage has therefore been to reduce the general death rate, especially by the reduction of deaths from typhoid and from cholera (and in some towns from diarrhœa), but partly, in all probability, by general improvement of the health. The action has been, in fact, very much in the direction we might have anticipated."

"The case of Dantzig," adds Dr. Parkes, "is a good illustration. In the nine years from 1863 to 1871, before the town was drained and supplied with pure water, the death rate was 36.9 per 1000, almost the same as in the previous 38 years (1825–62), 36.5. In the five years, 1872 to 1876, when the new drainage and water-works were in full operation, it was only 28.5; thus there was an apparent saving of 3156 lives during that period. Cholera had attacked Dantzig eleven times, generally severely, and in 1866, it killed 1098 persons. It returned in 1873, but was unable to gain a footing, only 91 persons falling victims to it. Children being usually the most delicate indicators of disease, it was found that in the first period, before the drainage, there died out of every 1000 inhabitants 13.04 children; in the second period, after the drainage, only 10.77; or the lives of 855 children were saved during the second period."—Ibid. p. 387.

and sewers, properly constructed of vitrified pipe, detain and accumulate no deposit, emit no offensive smells, and require no additional supplies of water to keep them clear.

5. An artificial fall may be cheaply and economically obtained by steam pumping, and the cost of the whole system to each house is much less than the cost to that house of removing its refuse by hand.

6 All offensive smells proceeding from any works intended for house or town drainage, indicate the fact of the detention and decomposition of ordure, and afford decisive evidence of malconstruction, oı of ignorant or defective arrangement.

As Col. Waring, from whose condensation I have copied the above general conclusions, says: "The sanitary authority of every town should have entire control over the sewers, with power to decide what shall be admitted to them, and what excluded, and to levy an additional tax in all cases where an undue use is made of the public convenience." A system embodying the requirements of sanitary science may be more costly at the outset, but in the end it will be more economic. Full of wisdom is the conclusion of the Army Sanitary Commission, that "the sooner the idea that stations are unhealthy because they are unhealthy is replaced by the conviction that an unhealthy station represents an annual loss far greater than the cost of improving it, the more certain will striking differences in local statistics be equalized." Franklin's magnificent saying, "public health is a nation's wealth," of course holds true of each local community. It is far better to strive after such a consummation by enlightenment and free endeavor than under the compulsory lash of law, indicated at the outset by Dr. Rush.

THE WATER-SUPPLY OF MILWAUKEE.

The supply of wholesome water in sufficient quantity is a fundamental sanitary necessity. Without it injury to health inevitably arises, either simply from deficiency of quantity, or more frequently from the presence of impurities. In all sanitary investigations, the question of the water-supply is one of the first points of inquiry, and of late years quite unexpected evidence has been obtained of the frequency with which diseases are introduced by the agency of water."—PARKES.

THE WATER SUPPLY OF MILWAUKEE.*

As an examination into the condition of the water in all the public and private wells of the city, both chemically and microscopically, would involve a greater expenditure of time and money than the Commissioner of Health has at his disposal, I must content myself with presenting some general considerations which may be of practical benefit to the people. The proper method of investigating the subject may be clearly indicated, and by the cautious use of such data as already exist conclusions may be safely reached, which more comprehensive and exhaustive analyses of waters used for domestic purposes in Milwaukee would not materially affect. Data gathered by the State Geological Survey, when it was under the charge of the late lamented Dr. Lapham, under my own charge, and under the charge of Prof. Chamberlin, will be freely used. Prof. Gustavus Bode, the eminent chemist of this city, has given me free access to his notes, with a liberality characteristic of the truly scientific man.

ABSOLUTELY PURE WATER

does not exist outside of the chemist's laboratory, perhaps not outside of the chemist's ideal formula. Various are the sources of its contamination. The gases emanating from decaying organic matter rise in the air and pollute water while in a state of vapor. As dew, hoar frost, and snow, it receives impurity from the same source. In the cloud-form of vapor and rain, before it falls to earth, it is also contaminated by smoke and the mineral fumes of factories. On the roofs of buildings it is again contaminated by vegetable growths, by paints, and by the poisonous excreta of birds. On uncultivated grounds it is further polluted with decaying leaves, rotting wood, dead weeds and the putrefying remains of insects and wild animals. On cultivated grounds it dissolves and carries along with it dirt, manure, etc. In towns, kitchen slops, butchers' offal, decomposing garbage, stable refuse, the contents of hog-pens, privies, etc., turn it not unfrequently into a "dead bree," offensive to the nostrils and destructive of health. As water is absorbed by the earth, while it thus parts with more or less of its accumulated organic impurities, it dissolves out the minerals existing in various geological formations, and becomes impregnated with sulphur, iron and other things, some of which are unwholesome. As water flows from the surface of the earth, and from springs under the earth, forming streams and rivers that wind their devious way to the great oceans, all the sources of contamination here enumerated unite to render it unfit for domestic use. No wonder high authorities have attributed one-third the diseases that afflict humanity to the use of impure water.*

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*The greater portion of this chapter is taken from my report to the Common Council, under date of June 17, 1878, in response to the following:

"Resolved, That the Health Officer be and he is hereby directed to examine into the condition of the water in the various private and public wells throughout the city and report to this Council without unnecessary delay, with such recommendation as in his opinion will subserve the health of the city."

QUANTITY NECESSARY.

Yet mankind must have water for drinking, cooking of food, ablution, and the washing of clothes. In the composition of a man weighing 154 ℔s. there are 116 ℔s. of water and only 38 ℔s. of dry substance. Dr. Parkes, one of the highest hygienic authorities, says that an adult requires daily 3½ to 5 pints of water, but nearly one-third is contained in the solid food. Health is affected not only by the water that is drunk, but also by that used for cooking, washing culinary articles, cleansing wearing apparel and bathing. The quantity of water needed daily for all these purposes is not very great. Mr. Denton, one of the foremost sanitary engineers now living, says: "Eight gallons may be safely taken as representing the extreme quantity of water required, of which the quality must be of the purest. The additional supply required for every household purpose,—if the rules of cleanliness are duly observed,—including the water used in closets, and in washing floors, etc., as well as that used in stables, in the washing of carriages, and for other outside purposes, increases the 8 gallons to 15 gallons per head. All beyond this quantity taken for private use is mere waste, which would cease to exist if, in addition to a fixed charge for that quantity, every consumer paid for what he had besides." To this may be added the quantity needed for public uses and for manufacturing purposes. The experience of European cities and the older American cities has shown that 25 gallons daily per head, is abundant for all purposes.

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*At the close of a long discussion on the deleterious effects of impure drinking water, Dr. Parkes comes to the following general conclusions:

"1. An endemic of diarrhœa, *in a community*, is almost always owing either to impure air, impure water, or bad food. If it affects a number of persons suddenly, it is probably owing to one of the two last causes, and if it extends over many families, almost certainly to water. But as the cause of impurity may be transient, it is not always easy to find experimental proof.

"2. Diarrhæa or dysentery, constantly affecting a community, or returning periodically at certain times of the year, is far more likely to be produced by water than by any other cause.

"3. A very sudden and localized outbreak, of either typhoid fever or cholera, is almost certainly owing to introduction of the poison by water.

"4. The same fact holds good in cases of malarious fever, and, especially if the cases are very grave, a possible introduction by water should be carefully nquired into.

"5. The introduction of the ova of certain entozoa by means of water is proved in some cases, is probable in others.

Since there are so many sources of water contamination and human beings must have it every day, what are the sanitary laws to be obeyed, on peril of health or life, in order to procure it in sufficient quantity and sufficiently pure? Of course, discussion of the problem is here limited to the quality and quantity of the local supply. The resolution of the Council would seem at first sight to limit the discussion still further to the water of the wells in the city. But as the Commissioner of Health is also required to make "such recommendations as in his opinion will subserve the health of the

"6. Although it is not at present possible to assign to every impurity in water its exact share in the production of disease, or to prove the precise influence on the public health of water which is not extremely impure, it appears certain that the health of a community always improves when an abundant and pure water is given; and, apart from this actual evidence, we are entiled to conclude, from other considerations, that abundant and good water is a primary sanitary necessity."—Practical Hygiene, 1878, p. 60.

city," a more comprehensive treatment of the subject will be the plainest and the shortest road to the desired end.

SOURCES OF SUPPLY.

Waters, according to their sources, have been well classified by the Rivers Pollution Commissioners appointed by the British Parliament, in their sixth annual report, as follows: (1) Rain water; (2), upland surface waters from uncultivated, or but slightly cultivated surfaces not manured; (3), surface waters from cultivated lands; (4), shallow well waters; (5), deep well waters; and (6), spring waters. All these waters are found and used in our city. The main sources are the shallow wells and the lake. The same Commissioners classify waters, according to chemical analysis, as follows:

I. Wholesome waters: (1), spring waters; (2), deep well water; (3), upland surface water.

II. Suspicious waters: (4), stored rain water; (5), surface water from cultivated land.

III. Dangerous water: (6), river water to which sewage gains access; (7), shallow well water.

It may be noted here that shallow well water is regarded as the most dangerous of all. With us, the Milwaukee river water in the city, where it receives the sewage from sixty or seventy thousand inhabitants, is more dangerous than the waters of the shallow wells. Above the city it is less dangerous.

. It must also be remarked that very dangerous water may be clear, cool, sparkling, free from smell, and pleasant to the taste. The British government had very great difficulty in closing some of the wells of London, because the people were deceived by the wholesome appearance of the waters. Chemical analysis, in the hands of such able men as Dr. Edward Frankland, revealed the fact that some of these palatable, clear, cool waters, were worth two dollars a ton for manure.

SPRINGS,

The waters of which are classed as most wholesome, are not numerous in Milwaukee, but several of them are very fine. Some of the so-called springs are only places where the surface water oozes out, which is more dangerous than the waters of shallow wells. Here, as well as elsewhere, along the shore of Lake Michigan, a layer of former beach deposit, consisting of sand and gravel, rests upon an impervious layer of blue boulder clay which intercepts the percolating water and causes it to flow out in little dripping rivulets along the lower portion of the bluff. These little rivulets make "springy" ground. The water is not bad, but it is not by any means up to the standard of pure spring water, the source of which is from the rocky formations of the earth. And over the beach deposit mentioned there is a layer of red clay, above which there is another beach deposit. From this, again, oozes streamlets, the water of which is of still poorer quality, but not so bad as the surface water. In other portions of the State, springs arising from the horizon of the junction of the lower Magnesian limestone with the Potsdam sandstone, from the horizon of the junction of the Trenton limestone and the St. Peter's sandstone, from the horizon of the junction of the cavernous Niagara limestone, and the Cincinnati shales, and from the Kettle Range, pure in the order mentioned, afford abundant supplies of wholesome water, unfortunately beyond the reach of Milwaukee, which stands upon the highest geological ground of Wisconsin. The water that falls from the heavens, and becomes polluted by organic matter on the earth's surface, descends through vast filtering layers of gravel and rock, before it emerges in wholesome springs.

DEEP WELLS,

Regarded, next to springs properly so-called, as the source of most wholesome water, are not abundant in our city. A deep well may be defined as one reaching the water stored in the underlying rocks of the earth. Such water is free from organic impurities, but may contain mineral impurities in such abundance as to render it unfit for domestic use. There is a well at the cattle yards of the Chicago, Milwaukee & St. Paul railroad, which is 1048 feet deep. It delivers water from the St. Peter's sandstone 65 feet above the surface. There is also one on the place of Col. W. H. Jacobs, which is 1200 feet deep and delivers 300 gallons of water per minute above the surface. It contains in one gallon, U. S. measure, over 14 grains of sulphate of lime, nearly 9 grains of sulphate of soda, besides other impurities, which render it undesirable for household purposes. There is also an artesian well in the Forest Home Cemetery, and another at the distillery of Hon. Thomas O'Neill, two miles south of the city.

Including the middle Potsdam there are four water-bearing strata beneath Milwaukee which may be reached by boring. But better water may be obtained in greater abundance and more cheaply; therefore it is not necessary to dwell further on the interesting topic of artesian wells in this connection. There is a fair chance of obtaining water by boring into the cavernous Niagara limestone, also another chance by boring on to the Cincinnati shales, an excellent chance by going still further down through the Trenton limestone to the St. Peter's sandstone, and almost a certainty by boring on through the Magnesian limestone into the Potsdam sandstone; but the purer water of Lake Michigan lies at our doors, to be had in unlimited quantities by pumping and scientific distribution.

Among the wholesome waters,

UPLAND SURFACE WATER

is regarded as next in order of purity. As we have seen, in discussing spring water and deep well water, there are conditions which make exceptions to a general rule. So upland surface waters differ greatly, according to the geographical and geological formation of the country. Such waters exist only in uninhabited or partially inhabited, mountainous districts and new countries. This source of water supply I shall allude to further on.

STORED RAIN WATER

stands first among suspicious waters. It is not now much used in this city for drinking, but a good deal for washing. When gathered from clean slate or hard tile roofs, stored in properly constructed cisterns, and well filtered, it is wholesome. Mossy, sooty, decaying wooden roofs, cisterns into which polluted surface water drains, the excreta of birds that rest on houses, together with the smoke and organic vapors infecting the falling rain over large cities, make it unwholesome in spite of the best filtering. Not unfrequently the cistern water is the worst smelling stuff about houses. Washing bed clothes and wearing apparel in it is not according to sanitary rule. The excreta of pigeons pollute it most. Guano tea is not good for washing fine linen. The organic matter undergoes putrefactive decomposition, making the cistern a special source of unhealthiness. For this reason pigeons are a public nuisance, which it ought to be lawful to kill by any means except shooting and poison.

Among the

DANGEROUS WATERS,

the drainage from cultivated lands is worse than stored cistern water. It enters into the water supply of the city only as it finds its way into shallow wells and the lake. Among the dangerous waters is that afforded by rivers to which sewage gains access. The three rivers running into the city are all of this clsss. They flow through populated regions, and drain cultivated lands. They traverse considerable villages where they receive the manure of stables and hog-pens, the offal of slaughter-houses, the refuse of manufactories, the garbage of habitations, dead animals, and the contents of privies. Within the city, the Milwaukee river receives the sewage from more than half the population of the town. From North street to the lake it is a public nuisance of the worst kind. Ice cut from any of these rivers below the entrance of sewage is poisonous and should not be used even for cooling purposes, where the vapor arising from it as it melts comes in contact with foods or drinks. The history of sanitary science contains sad records of typhoid epidemics, arising from the use of such ice. The British Commissioners, already quoted, give the results of long and exhaustive investigations as follows: "(1), That when the sewage of towns or other polluting organic matter is discharged into running water it is not possible to render that water fit for drinking; (2), that the admixture of a small qnantity of the specific poisons capable of producing cholera or typhoid fever with a large volume of drinking water is sufficient for the propagation of those diseases; (3), that there is no river in the United Kingdom long enough to secure the oxidation and destruction of any sewage which may be discharged into it, even at its source; (4), that artificial filtration constitutes no effective safeguard against the propagation of those epidemics by polluted waters."

The waters of

SHALLOW WELLS,

or of wells in the "drift" formation, are regarded as the most dangerous of all. As Aristotle said of oligarchies, we cannot predicate that one is better than another, but that some one is not so bad as another. In our city the shallow wells are very diverse. The waters of some are exceedingly bad, of others fairly good. The geological structure of the "drift" and topographical features determine their character. If we penetrate the earth, as in sinking a well, we first find soil and loose dirt of varying thickness, then we strike the "upper red clay" in most places. After passing through this we enter a beach deposit of sand and gravel. Going down, we next find the "lower red clay." Beneath this is another beach deposit of sand and gravel. Under that lies a sheet of "blue boulder clay." There are six layers; three of clay and three of looser, more porous material. The three sheets of clay intercept the water which percolates freely the earth, sand and gravel beds that lie upon them at different levels. Some of our shallow wells only reach down to the upper red clay. The waters of these are very bad. Other wells penetrate deeper, to the lower red clay.

The waters of these are not good, but by no means so bad as the first. Many wells go down fifty feet or more to the blue boulder clay. The waters of these are very good where surface drainage does not run into them from the top of the ground. The first class of shallow wells, or those that only reach to the uppermost layer of clay, are little better than cess-pools. They receive the surface water which is impregnated with slops, offal, stable manure and the contents of privies. The second class, or those that descend to the gravel bed between the upper and lower sheets of red clay, are very much better. They receive water that has been partially filtered. Yet, in most cases, the surface water drips down into them, poisoning them more or less, according to the conditions of the locality in which they are found. The third class, or those that descend to the sand and gravel bed between the lower red clay and the blue boulder clay, reach water that has been more thoroughly filtered, and may be regarded as fair in quality. But they are liable to contamination in the same way as the second class.

The number of these shallow wells, somewhat technically so-called, runs into the thousands. Many of our people are still dependent upon them for water. All of them are dangerous; some of them extremely so. The only way to determine which of them are less dangerous, is by a general microscopical examination and chemical analysis, which this department has not the means to undertake. And knowledge in this respect would not afford any great amount of relief. Families dependent upon their wells for water would gain nothing by finding out that they are daily drinking a clarified solution of animal manure, or privy drainings. These conditions, however, exist only upon the higher grounds. In the lowlands, along the rivers, where the process of denudation has gone on cutting through the regular formations of the "drift," some shallow wells have been sunk in the alluvial deposits, which are little more than receptacles of surface water in which every species of filth has been steeped.

THE REMEDY.

Fortunately for Milwaukee, the remedy is close at hand and has already been extensively used. Lake Michigan furnishes an exhaustless quantity of excellent water, which has been brought by the skill of the engineer into a large number of our dwellings. Chemical analysis shows that in 1000 parts of the lake water the following substances are found:

Lime	0.048
Magnesia	0.016
Soda	0.002
Silica	0.016
Sulphuric acid	0.005
Chlorine	0.003
Carbonic acid	0.053
Chloride of sodium	0.006
Sulphate of lime	0.009
Bicarbonate of lime	0.079
Bicarbonate of magnesia	0.035

It is a gratifying fact that this water contains no organic matter. There is enough carbonic acid in it to make it nearly as palatable as spring water. The bicarbonates of lime and magnesia make it somewhat "hard," but hardness thus caused is what is technically called "temporary" hardness, which boiling for an hour nearly corrects, which may also be corrected by Dr. Clark's process of softening with caustic lime,—a process formerly patented in Great Britain and commended by an experience of many years. The sulphates of lime and magnesia make what is called "permanent" hardness. There is very little of the former and none of the latter in the water of Lake Michigan, while the water from deep borings in this region contains both in abundance.

WHY THE LAKE WATER IS PURE.

The enquiry is often made: How can the water of the lake be pure when so many filthy rivers flow into it? The lake is large, like a great inland sea, and its waters are purified by the action of winds and waves. Or, to express it more accurately, organic matter is rendered harmless by the process of oxidation, which process is hastened by the natural agitation of large bodies of water. Besides, Lake Michigan receives most of its water directly from the clouds of heaven. The average rainfall over its wide surface is more than thirty inches a year. An expanse of water, two feet and a half deep, as long and wide as Lake Michigan, while not beyond computation, is beyond ordinary comprehension. This water, falling year by year on the bosom of the "unsalted sea," is not polluted in its descent by smoke and organic vapors rising from below. It is almost pure. If we trace a circumambient line, running zigzag througn Wisconsin, Illinois, Indiana and Michigan, within which the water shed is towards the lake, we shall find that this line encloses an area of land less in extent than the area of the lake itself. Of course the rain falls on this irregular girdle of earth to the same depth, or nearly the same, as on the lake; but only one-third, or less than one-third of the water falling on the land is carried away by the rivers. Mr. Dalton, President of the Geological Society of England, has shown by a long series of experiments that in a total average rainfall of 26.609 inches, only 8.227 inches flow away in rivers. The difference of 18.382 inches is evaporated or lost. Consequently Lake Michigan receives fully two-thirds of its water in almost virgin purity from the sky.

SUPPLY OF LAKE WATER SHOULD BE EXTENDED TO THE WHOLE CITY.

It is, therefore, a recommendation of the Commissioner of Health, which "in his opinion will subserve the health of the city," that the Common Council use all its municipal legislative power to extend water-pipes as rapidly as may be to all parts of the city, affording every citizen an opportunity of procuring, in a state of wholesome purity, an abundance of the liquid without which man cannot live. Water forms nearly three-fourths the weight of the body. "Water," says Professor Huxley, "gives fullness and flexibility to the softer tissues, and is the great agent of movement within the system. It performs the same office of transportation and exchange in the vital economy that it does by oceans, rivers and canals, in the commerce of the world. Nutritive substances cannot enter the system, nor the debris of the tissues leave it, except in a state of solution; it is the office of water to bring them into this condition, and to convey them to their various places of destination."

HYDRANTS SHOULD BE OPENED

in the alleys, giving the poor access to the fine water of Lake Michigan, at a minimum cost. As fast as possible, the dangerous wells of the city should be closed forever. They have served their needed purpose and must pass away with the sanitary progress of our people. When the population of the town was small they were by no means so impure as at present. Increasing accumulations of filth have made them dangerous to public health. In various quarters of the town bad engineering in the construction of steeets has aggravated the evil. Grades too high have confined the surface water on lots, where, becoming stagnant, it not only creates nuisance but, dissolving unmentionable things, finds its way, burthened with foul poison, into shallow wells. Lower street grades might have afforded surface drainage to large areas, making them wholesome. The Board of Public Works has thus inherited blunders of the past and should receive all possible aid from the Common Council in carrying out needed reforms.

The locality in the lake where water is taken up by pumping needs consideration. Milwaukee bay bends inward like the segment of a circle. At the point fartherest inland it receives the sewage and drainage of the city. The foul matter amounts to many thousands of tons per annum. It is not far away to the off-shore fountain whence comes the water distributed to our people. Whenever the wind blows from the southeast a current is formed along the inward-bending beach of the bay, which flows outward at North Point, almost directly over the end of the pier extending from the pumping works, carrying with it some of the organic matter emptied into the lake by our foul rivers. Again, when the wind blows strongly from the northeast the water is roiled from the bottom, where the sand contains a small percentage of the town sewage and surface wash. For these reasons, it would have been better to have chosen a place further north, beyond the Point, in Whitefish Bay, from which to have taken up the water for public use. Something will have to be done in the near future to avoid this source of contamination in water which it has cost so much to introduce. Every Board of Public Works needs the services of a sanitary engineer.

Thus, ignorance of, or indifference to, sanitary laws entails upon communities vast subsequent expenditure and subjects them to intermediate dangers, the importance of which it is not easy to overestimate. It requires line upon line, precept upon precept, to keep human beings from breathing, eating and drinking their own excreta, like hibernating animals. They sicken and die with sewer-gas in their houses, with solutions of privy ordure in their wells, and lay to divine Providence calamities which should be scored up to the heavy account of their own short-sighted cupidity, their own conceited ignorance, and their own inert stupidity.

CHEMICAL ANALYSIS OF WATERS.

The aim of this section is not to instruct chemists as to methods, but to indicate to the people the great difficulties that must be encountered by chemists who undertake to make reliable analyses of waters containing unknown substances. Good books on the subject are Sutton's Volumetric Analysis, 3d edition; Hassall's Adulteration Detected, 1876; and especially Wanklyn's Water Analysis, 4th edition. Nitrogen gas, sulphurated hydrogen gas, carburetted hydrogen gas, lime, chlorine, sulphuric acid, nitric acid, nitrous acid, ammonia, iron, sulphides, organic matter, lead, copper, zinc, magnesia, phosphoric acid, arsenic, are among the substances for which the chemist must seek, with delicate tests and more or less complex processes. Dr. Frankland has probably done more, in a sanitary direction, than any other chemist in Europe; therefore I copy here, from Mr. Denton, an explanation given in "Engineering," of his method of ascertaining the quality of water used for domestic purposes:

"Directing his attention chiefly to the amount and nature of the dissolved organic substance—to the consideration of which it has long been perceived that the question of wholesomeness is limited —he (Dr. Frankland), first ascertained, and proved, that the results obtained by methods then in use were either defective or erroneous, and in reality afforded only an increased facility for guessing whether water was wholesome or not. To meet this difficulty, Prof. Frankland devised a plan by which carbon and nitrogen, the two most important constituents of the organic substance in water, could be determined; and guided by the fact that so far as the nitrogenous animal substances introduced into water by sewage contamination might remain undecomposed, they were most likely to communicate unwholesome characters, he made these determinations the basis for judging as to the quality of the water. He also supplemented that plan by a determination of the nitrogen present in the water as nitrites, nitrates, and ammonia; for, since those are the products into which the nitrogenous animal substances in sewage are converted by the self-purifying action of the flowing water with which it is diluted in a river, their amount would indicate the extent to which the purification had advanced. By this means four results were obtained; in the first place, the total amount of combined nitrogen in the water would indicate to some extent the original sewage contamination, when the amount of combined nitrogen in sewage was taken into account. Of that total amount of nitrogen, the portion existing in undecomposed organic substance would be a measure of the sewage admixture which had not undergone conversion into products of a harmless nature, and it would serve to indicate the relative degrees of purity and wholesomeness of the water. If the amount of this organic nitrogen in water did not exceed 1-30 of a grain per gallon, corresponding to an unaltered sewage contamination of about .5 per cent., such a result might be disregarded as being little above the average amount of experimental error, but in the event of larger amounts of organic nitrogen being found, there would be good reason for suspecting the quality of the water. A further indication of the degree of purity is furnished by ascertaining the amount of ammonia, which is a product of the putrefactive decomposition of the animal substance in sewage, and in water of good quality this should not amount to more than about 1-500 of a grain per gallon. The estimation of the nitrogen existing in the state of nitrites and nitrates does not afford any direct indication as to the quality of water, and the extent to which the nitrogenous animal substances of the sewage or manure, with which it may have been previously contaminated, have undergone conversion into these harmless products. At the same time, if the presence of a very large amount of nitrogen in this form indicates a considerable previous sewage or manure contamination, amounting, say to .5 per cent. or more, there is then reason to suspect the quality of the water, since there would be a possibility that some of the deleterious contents of the sewage admixture might still remain in the water and be capable of causing mischief. If, at the same time, the water contained much organic nitrogen, there would be ample reason for declaring it unfit for dietetic use. Apart from certain minutiæ in the shape of corrections, to allow for ammonia, nitrites and nitrates, originating from rain water, these are the chief features of Dr. Frankland's method of determining the quality of water, and it is, beyond question, the only one yet devised that has been tested on any considerable scale, and that has been found capable of indicating, with any claim to scientific precision, the history and actual condition of water intended for domestic use."

It is certain that our water, which is pumped from Lake Michigan, ought to be subjected to the most careful analysis by a chemist who is familiar with the method of Dr. Frankland. And specimens of the water at its worst, as well at its best, ought to be selected for such analysis. There is a suspicion in the minds of many citizens that our drinking water is polluted by the great volume of sewage and drainage of the city, which empties into the lake two miles away from the point where the water enters the pipes through which it is pumped to the reservoir, thence to be distributed to our houses. Others are firmly of the opinion that the filth of the town does not reach the immediate source of our water supply. In this matter no belief or disbelief should be entertained. The question can and should be settled at the earliest possible moment by accurate scientific examination.

SOMETHING BEYOND CHEMISTRY.

And it must not be forgotten that there is an immeasurable distance between organic and organized matter. In passing from the former to the latter, chemistry affords us no aid. Give the chemist a handfull of sound wheat and also a handfull of ground wheat. His science can not tell the difference between the two. The dead elements of the one are exactly equal, in quality and quantity, to the dead elements of the other. Yet from another point of view, how different are the two! The handfull of unground wheat, the organized wheat, has within it the power to multiply itself, under favorable circumstances, till it cover the world with harvests. The ground wheat may nourish an animal or a plant, or it may mingle with the inert elements of the earth, but under no circumstances can it multiply itself. You may give the chemist some healthy unbroken eggs and also some crushed eggs. As chemist, he cannot tell the difference between the two. Both furnish to him the same elements. Yet there is a chasm between them as wide as the chasm between life and death. The whole eggs, under favoring conditions, will hatch, produce animals of their kind, which may at length people whole continents. The broken eggs have ended their existence, except as lifeless matter, which may enter an endless series of other forms, but never can "increase and multiply."

This vital distinction should never be lost sight of in any thorough-going sanitary discussion. It is the organized matter in the water we drink that "must give us pause." A few spores, invisible to the naked eye, of some deleterious cryptogam may enter the stomach with the drink and there take root and increase into a growth of fatal disease. The ova of microscopic animalcules, or animalcules already full grown, may enter the system with drinking water, and feed upon us till we die. Professor Tyndall tells us that the spores of the *bacillus anthracis** killed nearly a thousand human

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*The fatal splenic fever is caused by the spores of *bacillus anthracis;* a transitory disease is caused by the developed plant.

beings and more than fifty thousand animals in the four years, 1867–70, in the province of Novgorod. Many of the inhabitants of Egypt are afflicted with a fearful disease, from *Bilharzia haematoba* imbibed by drinking the waters of the Nile. It has its origin in a living organism which chemistry would utterly fail to discover.

Hence the necessity of examining the water from our hydrants with the microscope as well as by chemical analysis. Quite likely the same organized matter, the same microscopic plants and animals, would not be found which scientists have discovered in distant parts of the world, but others might be found that are deleterious to health and life.* If such exist, they probably come from the befouled rivers flowing into the lake, the water of which in its unpolluted state is clean and wholesome. "A very curious circumstance," says Professor Van Beneden, of Louvain University, "is the actual rarity of the Bothriocephalus among the inhabitants of the shores of the Lake of Geneva, though formerly it was very common there. This diminution, if we may not call it a disappearance, is due to the change which has been made in the construction of water-closets, all of which formerly emptied themselves into the lake, so that the embryos were hatched in the water, and persons were infected through drinking. At present the refuse of the towns is carefully collected for the purpose of manuring the land. This is the result of the advice of M. de Candolle half a century ago; for this naturalist clearly understood how great was the loss to agriculture from the neglect of this fertilizing agent."

SOURCES OF DISEASE.

There is no doubt whatever that, if any portion of the sewage and drainage of the town emptied into the lake by the rivers reaches the immediate source of water supply, then disease germs inter-

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*"The same host does not harbor the same worms in the different regions of the globe which it inhabits. This relates both to the parasites of man, and to those of the domestic animals. Thus the large tape-worm of man, which naturalists call *Bothriocephalus*, is found only in Russia, Poland and Switzerland. A small tape-worm, *Tænia nana*, is observed nowhere except in Abyssinia; the *Anchylostoma* is known at present only in the south of Europe and the north of Africa; the *Filaria* of Medina, in the west and the east of Africa; the *Bilharzia*, that terrible worm, has only been found in Egypt."—Van Beneden, Parasites, p. 105.

mingled with it also reach the same point, and may be conveyed to the mouths of the people. It is not necessary here to determine the question, whether all infectious diseases spring from organic or organized matter. It has been shown by Koch and Cohn, and demonstrated by Prof. Tyndall, that fatal splenic fever is caused by the spores (microscopic seeds) of *Bacillus anthracis.* It was discovered by Dr. Obermeier of Berlin, and the discovery was experimentally confirmed by Dr. Heydenrich, of St. Petersburgh, that the disease called Relapsing Fever is caused by certain minute spiral organisms in the blood, which may be transplanted by inoculation, which may be propagated from seeds. Hallier and Klobb, two very high German authorities, have found numerous fungi in cholera dejecta, and perhaps have discovered the cholera germ. The contagium of scarlet fever, if it be an organism, has never been seen by any microscopists, yet its especial habitat is the epithelium of the human body, which, as Dr. Parkes has shown, will remain in water for months unchanged. Septic poison is proved to be the exclusive product of *Bacteria,* rod-like microscopic organisms; plants that have no root, no leaf, yet move like animals which have no foot, no hand, no head. Lionel Beale discovered, and Chauveau demonstrated, that the contagium of small-pox is a vesicle which, according to Burdon-Sanderson, does not exceed 1-20000 inch in diameter. But the doctrine of a *contagium vivum* has many able opponents like Dr. B. W. Richardson. Others, like Dr. Burdon-Sanderson, take a middle ground and maintain that living contagia are "molecular aggregates," ultra-microscopical, "of which all we can say is, that they occupy the border-land between the living and the non-living things." Prof. Tyndall responds, that "between the microscopic limit and the true molecular limit, there is room for infinite permutations and combinations," and that "a particle, whether great or small, which, when sown, produces a plant, is proved thereby to be the germ of that plant." The conflict is between the ground kernel of wheat and the whole kernel, between the broken egg and the egg entire. On the one hand, it is maintained that different kinds of septic matter, acting as diffusive poisons or ferments, produce the various diseases that flesh is heir to. On the other hand, it is maintained that every disease has its origin in a vital germ that multiplies itself indefinitely in the fertile soil of the human body. The weight of scientific opinion is now in favor of the latter theory.

But, practically, it makes no difference which theory is correct. Mankind are just as anxious to escape being poisoned by a living thing as by a dead thing. It is just as hard to see a friend die with splenic fever, the cause of which is demonstrably known, as with enteric fever, the cause of which is unknown. Fortunately, the sanitarian is not obliged to wait for a solution of the great and interesting problem; he has to use the same means of preventing disease, whether disease is caused by living germs or dead ferments. We had better make haste to find out whether we are drawing from our costly hydrants particles of our own excreta, which are liable at any time to be impregnated with the germs or the virus of epidemic disease. It is important to consider whether individual citizens have a right to run through the sewers into a river, thence to find its way to our drinking water, whole cords of accumulated night-soil, from the vaults of old privies, where it has become putrescent with long decay, which may contain myriad spores of disease, which certainly is a mass of organic matter freighted with dangers to human life. "The opinions of chemists," said Prof. Hoffman and Dr. Blyth, in a Report to the General Board of Health in England, "are divided as to the manner in which organic matter in water is capable, under certain conditions, of producing a deleterious effect upon the human economy. But it is now generally admitted that the substances which constitute the organic matter of water act injuriously, by no means in consequence of being poisonous in themselves, but by undergoing those great processes of transformation called decay and putrefaction, to which all vegetable and animal matter is subject, when no longer under the control of vitality, either in plants or animals. These putrefactive processes either give rise to the formation of poisonous bodies, or they act simply as ferments, generating similar processes of decomposition in the substances composing the animal organism." Never has the older theory been stated better and there is no exageration in the implied warning.

In marked contrast with the above, so far as concerns the origin of infectious disease, is a pregnant passage from an address of Dr. Wm. Roberts, of Manchester, before the British Medical Association, quoted by Professor J. L. Cabell, chairman of Section on State Medicine and Public Hygiene, in a remarkable address delivered at the annual meeting of the American Medical Association in 1878. "If contagia are organisms," says Dr. Roberts, "they must possess the fundamental tendencies and attributes of all organized things. Among the most important of these attributes is the capacity for 'variation' or 'sporting.' This capacity is an essential link in the theory of evolution, and Darwin brings forth strong grounds for the belief that variation in plants and animals is not the result of chance or caprice, but is the definite effect of definite (though often quite obscure) causes. I see no more difficulty in believing that the *Bacillus anthracis*, is a sport from the *Bacillus subtilis** than in believing, as all botonists tell us, that the bitter almond is a sport from the sweet almond—the one a bland, inocuous fruit, and the other containing the elements of a deadly poison. Cholera suddenly breaks out in some remote districts in India and spreads from that centre over half the globe. In three or four seasons the epidemic dies away and ceases altogether from among men. A few years later it reappears and spreads again, and disappears as before. Does not this look as if the cholera virus were an occasional sport from some Indian saprophyte, which by variation has acquired a parasitic habit, and having run through countless generations either dies out or reverts again to its original type? Similarly typhoid fever might be explained as a variation from some common saprophyte of our stagnant pools or sewers, which, under certain conditions of its own surroundings, or certain conditions within the human body, acquires a parasitic habit. Having acquired

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*The allusion is to a conclusion of Professor Cohn, of Breslau, that the deadly *Bacillus anthracis* is identical in development and form, with the harmless *Bacillus subtilis*, only the rods of the latter move, while those of the former do not.

this habit it becomes a contagious virus, which is transmitted with its new habit through a certain number of generations; but finally, these conditions ceasing, it reverts again to its original non-parasitic type." As Professor Powell says, "How admirably this ingenious theory reconciles the observations of Murchison and others on the occasional pythogenic origin of typhoid fever with the doctrine of a contagium vivum, and harmonizes with the deductions of Budd, as to the continuous development of this fever, it is needless to insist."

If the theory is true, and a great majority of the best medical observers and thinkers in Europe and this country favor it, then we cannot shut our eyes to the calamity that may come upon us from the oozing of ten thousand privy-vaults, buried and unburied, into the wells of the city, and from the sewage that probably finds its way into the lake water pumped up for public use. Any year the preliminary conditions for the development of typhoid germs may be fulfilled, when we shall be visited with an epidemic of entiric fever more destructive than the epidemic of yellow fever which has visited the South during the past summer. An epidemic of yellow fever is like the burning of a pile of straw, while an epidemic of typhoid fever is like the burning of a pile of wood. The only way to avert the evil is to remove the cause in season.

SANITATION OF PUBLIC SCHOOLS IN MILWAUKEE.

"It is not meant that by any means all the influences injurious to health, during the school age, are due to the schools. Enough, however, comes from that source to make great improvement in that direction possible. Hereditary taint, bad home-education, insufficient sleep, late hours, improper or insufficient exercise, unsuitable food, clothes ill adapted to their true function, all come in for their share of blame; but even in these points, school-instruction, if under wise general directions, can do a great deal to counterbalance evil influences coming from other sources.—DR. LINCOLN.

SANITATION OF PUBLIC SCHOOLS.*

In the month of May last, (1878), the Commissioner of Health, mindful that the sanitary conditions surrounding the study hours of 12,000 children touch the homes and hearts of nearly all citizens, addressed the following questions, copied in part from a Massachusetts circular, carefully prepared, and having the same end in view, to the Principals of all our Public Schools:

I.—Q. 1. Is the site high? 2. Is the site well drained? 3. Free from nuisances? 4. Sunny? 5. Protected from severe weather?

II.—Q. 1. Is there basement? 2. For what purpose used? 3. How many feet below ground? 4. Wet or damp? 5. What means to prevent dampness?

III.—Q. 1. Are there water closets? 2. How many and on what stories? 3. Of what sort? 4. How are water-closets ventilated? 5. Do they connect with cess-pools or sewers? 6. Are there any privies? 7. If so, how constructed? 8. And where situated? 9. Are they properly emptied and disinfected? 10. Are there proper provisions for both sexes? 11. Exposure to weather in reaching them? 12. Offensive odors from privies or closets?

IV.—Q. 1. In your judgment, are there ill effects on the health of the pupils from exposed or ill-managed privies or closets? 2. If so, what effects?

V.—Q. 1. How is the building ventilated? 2. Any ill effects on health from bad ventilation?

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*As a suggestion for this chapter, I am indebted to an excellent paper by D. H. Lincoln, M. D., of Boston, in the last Annual Report of the Massachusetts State Board of Health.

VI.—Q. 1. How is the building heated? 2. Any ill effects from bad heating? 3. What, in your judgment, is the best method of heating school-rooms? 4. Are some pupils over-warmed and others not warmed enough?

VII.—Q. 1. What is your experience in respect to the spread of contagious disease in schools and the remedies or means of prevention? 2. What is your opinion as to such prevention and the means to it?

VIII.—Q. 1. Are the walls of the rooms dry? 2. Are the rooms well lighted? 3. How many cubic feet of air in each room to each pupil? 4. Are there currents of air in any room endangering the health of pupils?

Responses were received from all the principals, giving very important information. The answers are remarkable for clearness, precision and intelligence. As each speaks from experience, he tells with the eloquence of brevity and directness just what the Commissioner wished to ascertain. These answers, taken together, contain an important record of the hygienic condition of the Public Schools in Milwaukee.

As, in a subsequent part of this chapter, I shall give in detail the results of a personal examination of all the public school buildings and their surroundings, I shall at the outset give, under different headings, a summary of the answers received from the principals, without any running commentary.

SITES.

The principal of the First Public School declares that the site is high, well-drained, free from nuisances and sunny, but not well protected from severe weather. The principal of the Jefferson School in the Second Ward says that the site is high but is not well drained, is exposed to the nuisance of foul privies, is sunny, and only "somewhat protected." The head of the Webster School in the Second Ward answers in the affirmative all the questions but the last; he complains that the site is not very well protected. The principal of the Third District School speaks of the site of the new building, which was then in process of erection, as low. It may be remarked, in passing, that nearly the whole of the Third Ward is elevated but a few feet above the lake and the river, and that it was impossible to find a centrally located site for a school building on high ground. The principal of the Fourth District School answers all the questions in the affirmative. So do the principals of the Fifth, Sixth, Seventh and Eighth District Schools, and the principal of the High School. The principal of the Ninth District School complains that the site is low, exposed to nuisances, and not protected from bleak winds. The principal of the Tenth District School complains that the "site is rather low" and not protected from severe weather. The other points he answers in the affirmative. The head of the Eleventh District School speaks of undrained ground and exposure but claims good elevation of site, freedom from nuisances, and plenty of sunlight. The principal of the Twelfth District School, complains that "the water falling on the more elevated land west flows down upon the school ground," and very properly suggests that "it would be a good thing to prohibit people living within two blocks of a school from keeping pigs on their premises." The other questions he answers in the affirmative. The principal of the Thirteenth District School answers affirmatively the first, third and fourth questions. He says the site "will be well drained, after it is graded, and regrets that it is not well protected from severe weather; open on all sides." The principal of the Fourteenth District School answers all the questions in the affirmative but the last; "is not protected from the cold wind."

BASEMENTS.

It will be most convenient and economic of space to take the schools in numerical order and give a summary of the answers to the interrogatories. 1. There is a basement, used for storage, about three feet below the surface of the ground, which is dry, but has no means to prevent dampness.—2. (Webster). The basement is used for storing wood and coal, is 3½ feet below ground, is dry, has sandy bottom and is "well drained by sewers."—2. (Jefferson). There is a basement 6½ feet deep, used for storing wood and coal, "in rainy days, wet, in dry days damp." Nothing is said about means of drainage.—3. No information.—4. There is a basement about 9 feet deep, used for storing wood and coal, not wet, "no necessity for means of drainage."—5. The basement is about nine feet below the play ground," is used for storing wood and coal, is "very damp," and as to means of drainage has "none that I can see."—6. There is a basement "to store away coal, wood and ashes," "as to southeast side on a level with ground, northeast and west side from 3 to 6 feet below level," "quite damp, needs grading and better draining." —7. There is a basement used for fuel and storage, "sometimes a trifle damp;" there is "a small furnace running in one room" to prevent dampness.—8. There is a basement "six feet below ground," used for "storing wood and coal," which is not damp, being "drained by sewer."—9. There is basement 3 feet deep, used for janitor's room and fuel, which is dry.—10. There is basement "about four feet below the ground," used for wood and coal, "sometimes damp," with "a little ventilation" as means to prevent dampness.—11. There is basement about 4 feet deep, used for storing fuel, which is damp and needs draining.—12. There is basement about 4 feet below the surface, used for storing fuel, "water stands in it most of the time," and it has no efficient means of drainage.—13. There is basement, "used for play-rooms, boiler-rooms, store-rooms and water-closets," about five feet under ground, "will be perfectly dry when grading is finished, and is drained by sewer."—14. "Our basement 5½ feet below the ground and is dry. The heating apparatus being in basement and the steam pipes passing through all parts of it, keep it warm and dry. Our only difficulty with the play-room there, is that there is too much dust arising from the cemented floor and a want of ventilation when the inclemency of the weather requires all the doors and windows to be closed." 15. (The High School). There is basement, used for fuel and water-closets, 4 feet under ground, which is damp, notwithstanding fire and drainage.

WATER CLOSETS, PRIVIES, ETC.

1. There are two privies, "frame-buildings on brick vaults," in the yard, with provisions for both sexes, with exposure to the

weather and "some" offensive odors.—2. (Webster School). There are two privies in the yard, "common wooden structures," "one about 10 feet from the building," "the other about 40 feet from it," with provisions for both sexes, exposed to the weather, with offensive odors. "The privies were drained into the sewers early in the spring and were for a time in good condition. At present they are very offensive."—2. (Jefferson School). There are "tolerable" privies in the school-yard, ventilated "by windows and an open door," "connected with a sewer on Chestnut street, in a very impracticable way," "only 7½ feet from the building." "They are very hard to empty because the outlet to the sewer is about half a foot above the level of the bottom of the vault. They are disinfected now and then by chloride of lime."—3. There are to be properly constructed water-closets, connected with the sewers.—4. There are brick privies, "about four rods from the building," "not perfectly" emptied and disinfected, with provisions for both sexes, with exposure in reaching them, with "slight" odor.—5. "There are two large privies," "constructed with a vault and the vault connected in some way with the sewer," situated twenty-five feet from the building, with provisions for both sexes and exposure in reaching them. "The girls' side is not sufficiently large; many of the girls are kept waiting at certain times of the day." "One of them has had a stream from the hydrant put through it once in three years. I do not know how the accumulations are carried off. No disinfectants have been used to my knowledge for three years."—6. There are two privies "with nine closets each," "frame buildings above brick vaults, connected with sewers and receiving waste water and rain water from the main building, to keep vaults clean," "near the fence at north and south side of yard, about 30 feet east of main building," with provisions for both sexes, and, as to offensive odors, "I suppose not more than seems unavoidable."—7. There are two privies, one for each sex, "pretty well ventilated," 15 feet from the school house, not properly emptied and disinfected, and they cause nuisance. "A 'lean-to' on the west side of the boys" privy answers the purpose of a urinal, and the floor which is bedded on the ground is soaked with water all the time and is a crying nuisance so strong that when the wind is in certain directions the neighbors complain." —8. There are two wooden privies on brick vaults, 45 feet from the building; "vaults were emptied last November;" "no means of disinfection;" exposure to weather in reaching them; no offensive odor noticed.—9. There are two wooden privies on brick vaults, 70 feet from building, offensive, not cleaned, poorly ventilated, and the vaults are connected with the sewers.—10. There are two wooden privies over brick vaults, on the far side of the yard, the approaches badly exposed to bleak winds, the vaults of which are connected with sewers, not cleaned or disinfected, and offensive in odor.—11. There are two privies over "holes in the ground," not emptied, not disinfected, offensive in odor, and the children are exposed to the weather in reaching them. Here, as elsewhere, when no mention of the point is made there are provisions for both sexes.—12. There are two privies over vaults which have no connection with the sewer, which have not been cleaned nor disinfected, and emit offensive odor.—13. There are water closets in the basement, "ventilated by means of a foul air shaft," "they are not used at present, because there is no sewer connection, and no water in the building. There are two privies, "temporary structures," "30 feet in rear of building," "have not been in use very long," "exposed to weather in reaching them," "as yet no offensive odor."—14. There are excellent water-closets in the basement, well ventilated with a down draught, connected with the sewer, well warmed and free from sewer-gas.—High School. There are water-closets in basement, "the usual trap sort," "no special means" of ventilation, connected with sewer. There are also outside privies, with exposure and the usual offensive odor.

ILL EFFECTS ON THE HEALTH OF PUPILS.

Of course the responses of the teachers on this point are only the expressions of non-professional opinion, but some of them contain the results of intelligent observation and are therefore valuable. 1. "Pupils may take cold in going to them."—2. (Webster.) "I have no doubt that many pupils contract colds by visiting the privies during severe weather. In my opinion they should be heated. I believe our privies are not in a condition favorable to health at the present time. A good-sized stream of water, constantly flowing, would undoubtedly remedy matters very much."—2. (Jefferson.) "There are certainly ill effects—head-ache, nausea, vomiting, and general illness."—3. No opinion expressed on this point.—4. "No." —5. "I know of ill effects from exposure in going to the privies during the cold weather." "I think the young children take cold." —6. "I think ill effects from exposure;" "effects arising from sudden and great change of temperature."—7. "Undoubtedly bad air and noxious gasses must poison the blood. I have known of cases of congestion of the lungs brought on by the bad air and exposure in a cold, badly ventillated privy. One case in particular I call to mind in which a gentleman of my acquaintance nearly lost his life. The physician—a very intelligent man—said the congestion was brought on by using a cold and ill-ventilated privy once. I have no doubt that much catarrh and colds that prevails during the cold months is the result of our exposed and unventilated privies."—8. "Passing from a warm room to the cold air causes the pupil to take cold, followed in many cases by its usual sequelæ—head-ache, pneumonia, catarrh, etc."—9. No response on this point.—10. "Since the privies are out doors at a considerable distance from the building, there seems to be no ill effects on the health of the pupils."—11. "Colds."—12. "Liable to contract colds from exposure to the weather in going to and from the privies. Breathing offensive odors while at the privies is certainly injurious to the health."—13. "There are no ill effects on the health of the pupils from exposed or ill-managed privies thus far."—14. "None whatever." The water-closets are perfect.—High School. "I can't say;" "its mighty onpleasant."

VENTILATION.

1. "Chiefly by means of the windows; the air-registers are not sufficient." There are "doubtless some" bad effects from want of ventilation, "although it might be difficult to trace them."

—2. (Webster). "There is no system of ventilation in the building. In some of the rooms there are small registers in the walls, that are in my experience worthless. We have, therefore, no method of ventilating the rooms and halls, except by opening doors and windows." "While our pupils appear to be as healthy, in general, as those attending other schools, I am, nevertheless, confident that the health of both pupils and teachers is more or less affected by the lack of proper ventilation."—2. (Jefferson). "We have to depend mainly on windows and doors for our ventilation, although there are air-ducts in all of the rooms." In regard to ill-effects, "I suppose there are, sometimes, in a few cases."—3. As the new building is not completed, there are no views expressed on this subject.—4. Ventilation is "principally by windows," and there are ill effects.—5. "The building is ventilated by means of flues by the side of smoke flues. This proves to be of little avail, however, for the air becomes so bad that we have to practice ventilation by opening the windows, even in severe weather." "I know that many children take cold and suffer from the inadvertence of the teachers in respect to open windows and cold draughts."—6. The building is ventilated "only by doors and windows." "If the effects are not worse than they show themselves, it is owing to the constant care of teachers and sound constitution of our pupils."—7. "By opening the windows. There are ventilating shafts, but they are inadequate; some of them have been converted into chimneys since stoves have been introduced." There are ill effects—"colds or poison; we have our choice and take colds."—8. "Pure air is brought into the rooms by means of the heaters. There is no provision for removing the bad air, except by the doors and windows."—9. Building is "poorly" ventilated, and there are bad effects.—10. The ventilation is "by raising and lowering certain windows in the rooms; also by so-called registers;" and there are "some" bad effects.—11. "By windows." It is not stated whether there are ill effects.—12. "By means of windows, doors and a few ventilating flues in the chimneys." "At times the teacher must decide which is the more injurious—pure cold air, or warm air that is foul. The latter is too often considered less."—13. "The ventilation, in my judgment, is as near perfect as it can be made." "The general health of pupils and teachers has improved since the occupation of this building."—14. "Ventilation good but not perfect; the best that I have ever known in any school building. Ventilation can be improved by placing small stoves in ventilating flues to increase the rapidity of the circulation of air." "No perceptible ill effects upon the health."—High School. "By means of flues." "I think there are" ill effects.

HEATING.

1. Stoves are the means of heating, "provided with flues for inducting fresh air." There are ill effects from bad heating, but what effects we are not told. "Steam, with mechanical apparatus for producing air currents," is regarded as the best means of heating. "Decidedly so," is the answer to the question whether some pupils are over-warmed and others not warmed enough.—2. (Webster.) The building is heated by stoves; "I have no doubt that the dry, hot air is often the cause of headaches;" steam is regarded as the best means of heating; some pupils are warmed too much, others not enough.—2. Jefferson.) Building is heated by stoves. "In extreme cold weather we have those sitting near the stove nearly roasting, while those sitting in remote corners feel chilly." "In my opinion the best method of heating school-rooms is by steam. This would in the long run be more economical, too. It would also save much valuable space in the class-rooms."—3. "The old-fashioned chimney-place fire of log piled on log, is better, so far as health is concerned, than any modern invention. Next after this, the old oblong box wood-stove, I consider best. I have a good opinion of steam heating, but cannot speak of it from experience. Furnace heating circulates bad gasses at times and is as unreliable as the changing of the wind. The stove of any kind is more reliable." —4. Stoves are used, with ill effects and unequal distribution of heat. "In large buildings, steam at low pressure" is best.—5. "By means of Reddy's school heaters." "Much discomfort to a few scholars who have to sit near the stoves." The best means of heating is by "steam, or hot air furnaces which supply pure air with sufficient

moisture in it." "Some pupils suffer from the heat, those who sit near the stove. There seems to be no difficulty about warming every part of the room."—6. "All but one room and the hall by Reddy's heaters, and the former by Dexter's heaters." The ill effects are "none, but sometimes an escape of gas from Reddy's heaters." "Steam heating" is regarded as best. "Those sitting near the heaters frequently suffer."—7. "Reddy school heater," in other words the heating is by large cast-iron coal stoves. Ill effects are produced by "cold currents down the windows and on the floor to the stove." Some pupils are warmed too much, others not enough. The best means of heating is regarded as "steam—direct and indirect radiation, the radiators which are the in the room placed below the window."—8. "Cincinnati heaters"—big iron coal stoves—which produce ill effects "to some extent," warming unequally. The best means of heating is "by steam if the building can be thoroughly ventilated."—9. "By Reddy's heaters." Ill effects. Unequal warmth. "Steam" is best. -10. "By coal stoves," with ill effects, "especially in the northern rooms," and with unequal heating. "In my judgment steam-heating would be the best method, especially in larger buildings."—11. "By hot-air stoves," with ill effects and unequal heating. Steam is regarded as best.—12. "With stoves," producing ill effects, and causing "by our present method" unequal distribution of heat. The principal regards as best a "system of heating and ventilation in which pure air of a proper temperature is introduced in sufficient quantity, and the colder impure air is drawn off at the bottom of the room as rapidly as it becomes impure. But the system as I have seen it should be modified so that the heating and ventilation of *each room* should be under the entire control of the teacher in charge."—13. "The building is heated by steam and warm air." "No ill effect from bad heating." "In my judgment, the best method of heating school rooms is *by steam*." There is no inequality in heating.—14. "The method here adopted for heating and ventilation seems to me superior to any other that has come under my observation. The temperature in each room is very uniform and none are exposed to excessive temperatures except those very near registers and steam coils, and the difficulty can be entirely removed another season by the use of screens."—High school. "By steam and hot-air stoves," with unequal distribution of heat and, "I think," with ill effects. "Steam radiators in rooms" is regarded as the best method of heating.

CONTAGIOUS DISEASES.

1. "Prompt and accurate reports* from the Board of Health, as to the nature and locality of the disease, and care and watchfulness on the part of teachers, are the means of prevention." "Thus far they have proved effective, but I have thought that some penalty should be inflicted upon persons sending children to school from places where contagious diseases exist."†—2. (Webster.) "But very few of our pupils have suffered from diseases of a contagious character, during the recent season of epidemics. No fatal cases that I can recall to memory during the last two years. Great care has been exercised in excluding pupils from school, in whose homes such diseases existed, and cleanliness of person and clothes has been *insisted* on. My experience is that children are as ssfe (or safer) from contagion under such regulations than if removed from school. But very few cases of small-pox are noted in the school during the past few years, and *none*, that I can recall, when the pupil was properly vaccinated. I cannot remember a single case whose origin could be traced directly to the school." "My opinion is, that no pupil should be allowed to visit school, from any *family*, or *house*, in which contagion exists.‡ Vaccination should be general, and if necessary, compulsory, especially in schools—*public* and *private*. Persons knowingly sending pupils to school, while a contagious disease exists in the home or *house*, or allowing others to enter the house, or place of business, without proper notification, ought to be, in my opinion,

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*Such reports are made without delay from the Health Department to principals of schools.

†Laws exist, applicable to such cases, and will be enforced when necessary.

‡Such a regulation is now strictly enforced.

fined, or otherwise punished for each and every offense."* —2. (Jefferson). "I think that the school is an important factor in helping to spread contagious diseases, as are theatres, churches, etc., and in general, places where large masses of people congregate." "The means of preventing the spread of contagious diseases seem, to me, to be only of a palliative nature, such as cleanliness of the individuals and of the school building, through ventilation of the rooms and occasional deodorizing the outhouses and obnoxious places. Infected individuals, or those that come from houses where there is contagious disease, should at once be excluded for the time being, and the teachers should for this purpose be backed by a strong public sentiment of the community and have the hearty support and co-operation of the authorities."—3. "Vaccination, I find, is the only safe preventative of small-pox, and I have no hesitancy in saying that there is *no other* preventative." "In regard to other contagious diseases, I cannot speak with any definite conviction."—4. "My experience is that school sessions do not increase the spread of contagious diseases, where proper action is taken." "Teachers should seek by a strong cheerfulness to allay all morbid fear." "The children should be properly cautioned as to avoiding infected places or opportunities of contagion. To this end instructions through circulars might well emanate from recognized authorities." A proper and necessary means of prevention is "the exclusion of children who are infected, or liable to be."—5. "During the recent epidemic of small-pox and scarlet fever, the pupils of the school have been singularly exempt." "I think that a vigorous enforcement of the regulation requiring all pupils to be vaccinated, also the prompt exclusion from school of all pupils living under the same roof with persons suffering from contagious disease, is the most effective plan to prevent the spread of contagion. Notices from the Health Office are necessary to enable the principals of schools to guard against the introduction and spreading of disease in the schools by infected pupils."—6. "I have reason to believe that there is less danger of spreading such diseases as small-pox, etc., through schools, than when pupils are frequenting street societies, without knowing what the state of health of their friends and of the families of the latter is, provided the teachers are properly informed of all cases of sickness of an alarming character in their district and its surroundings."*—7. "I have not known of any child contracting any contagious disease in school." "I have found it necessary to watch the matter closely, as some children would try to conceal the fact of the disease existing in the family. I have found the notices sent by the Board of Health of great service to me. I think it WRONG not to placard the infected house,† so that children and all passers-by may be warned."—8. "Children are no more likely to contract contagious disease in school, than anywhere else." "Families having contagious disease should be excluded from school until there is no danger of their imparting it to others. In small-pox, vaccination should be resorted to, and should be thorough and frequent. For the past year this school has had very few cases of contagious disease."—9. No response on this point.—10. Cleanliness and ventilation are the two greatest enemies of contagious diseases. Also not tolerating sick children in the school-rooms."—11. "Our rule of suspending sick pupils works well."—12. "We have little trouble in this matter now. Vaccination, and placarding houses in which there are cases of scarlet fever, diphtheria and small-pox, have been efficient means."—13. "My school has been remarkably free from contagious diseases." "Vaccination as means of prevention against small-pox."—14. "A thorough vaccination of all pupils attending school and the dismissal of all in any way exposed to it, have completely stopped the spread of small-pox in three different schools that I have had charge of. In regard to other contagious diseases, I dismiss all in any way exposed to them. This has not prevented their spreading, but has probably checked them."—High School. "The only contagious diseases that I have observed to spread in schools, are measles, whooping-cough and chicken-pox. I know of no remedies to prevent the spread of the above diseases." "The spread of small-pox has been prevented by vaccination."

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*This is bravely and wisely said. An abundance of law exists to protect the public against the carelessness, willfulness or perversity of individuals in this regard, and will be enforced without fear or favor.

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*The very intelligent and well-educated teacher who writes this, is employing a language to which he was not born. The same may be said of some of the rest.

†All houses in the city, where there is contagious disease, are now placarded.

AIR AND LIGHT.

1. The walls are dry; the rooms are well lighted; there are currents of air, "when windows are open for ventilation." The average number of cubic feet of air for each pupil is 206. The lowest number of cubic feet in any room is 126; the highest, 360. —2. (Webster.) The walls are dry. All but two rooms are well lighted. The average number of cubic feet of air-space to each pupil is 130; the lowest, 107; the highest, 208. "Every precaution is used to prevent drafts, or currents of air, in the rooms and halls, but as we are obliged to open windows and doors in order to ventilate, it is often impossible to prevent them."—2. (Jefferson.) The walls are dry. All the rooms but two are well lighted; "but it should be stated here that the stoves take much light away. To the question—"How many cubic feet of air in each room to each pupil? The principal conscientiously responds: "Of all the questions propounded, this is the most difficult to answer. If it were a simple question of mathematical calculation, the task would be easy enough; but there are many complicating circumstances which materially influence the result. The rooms are neither of the same size nor of the same height. Some rooms are overfilled, others are not. In unfavorable weather the attendance is considerably lower in comparison with other schools, because it is the largest Primary School in the city (and in the North-West), containing nearly 1000 children, all of the lower grades. This of course makes a great deal of difference, as those that are present have more air-space on such days. The rooms which are over-crowded have generally two recesses during each session, during which the air is thoroughly renewed." The air-space per pupil is, in cubic feet, (1) 91, (2) 130, (3) 114, (4) 182, (5) 193, (6) 228, (7) 199, (8) 163, (9) 260, (10) 252, (11) 263, (12) 194. "These figures are of course only approximate."—3. No information given.—4. The walls are

dry. "Not all" the rooms are well lighted. There are dangerous currents of air. The cubic feet of air-space: (1) 730, (2) and (3) 156, (4) 380, (5) 104, (6) 242, (7) 88, (9) 167, (10) 135.—5. The walls are dry and the rooms are well lighted. There are also dangerous currents of air. The cubic feet of air-space to each pupil: (1) 401, (2) 283, (3) 194, (4) 177, (5) 185, (6) 202, (7) 142, (8) 120; average 208.—6. The walls are dry. The rooms "with few exceptions are well lighted and even those are not too bad." There are dangerous currents of air, "by opening doors and windows for the purpose of ventilating rooms, this being the only means of ventilation." The average air-space to each pupil is 160 cubic feet. The lowest number of cubic feet in any room is 75; the highest is 320. The numbers are only approximate.—7. The walls are dry and the rooms are well lighted. There are dangerous currents of air. The number of cubic feet of air-space for each pupil varies "from 107 in the 10th grade to 300 in the 1st and 2d grades."—8. The walls are dry and the rooms well lighted. There are no dangerous currents of air. The number of cubic feet of air-space for each pupil varies from 102 to 880.—9. Dry walls and plenty of light. The air-space varies from 45 to 224 cubic feet. In the branch school, one room has 43 feet, the other 61.—10. Dry walls and plenty of light, but bad drafts. The air-space varies from 145 to 160 cubic feet.—11. Dry walls, plenty of light, and no dangerous currents of air. The number of cubic feet of air-space varies from 100 to 160.—12. The walls are dry. The rooms are well lighted "with one or two exceptions." The cubic feet of air-space "average throughout the school, 189; highest in any room, 300; lowest, 143." "It is impossible to avoid drafts of air at times on account of our present method of ventilation."—13. The walls of the rooms are dry." "The rooms are well ventillated and lighted." "There are about 120–150 cubic feet of air in the several rooms to each pupil." "There are no currents of air in any room endangering the health of pupils." "In my opinion this is the best arranged school house in the city."—14. No information given under this head.—High school. The walls are dry. The rooms are well lighted. The number of cubic feet for each pupil varies from 137 to 200. There are unwholesome currents of air "when it is necessary to lower windows for ventilation."

This completes a summary of the answers given by the principals of the different Public Schools to the questions addressed to them by the Commissioner of Health. After the responses were all in, a personal inspection of all the Public School buildings in the city was made and, under date of June 22, 1878, was addressed to his Honor, the Mayor of Milwaukee, the following

REPORT.

During the past week, the Commissioner has examined all the district school-houses in the city, in order to verify by personal inspection the statements of the principals and to ascertain certain points which the most elaborate interrogatories may fail to reach. It is necessary, however, to state at the outset, that the principals are not responsible for the conclusions announced in this report. Neither is the Commissioner altogether responsible for the same. Sanitary Science imposes responsibility only for the accuracy of the facts on which it bases its own conclusions.

Reserving certain general deductions and statements of important principles for the close, I shall give a brief account of each public school building in the order of visitation.

The site of the Fourth District school building is high, free from surrounding nuisances, sunny, protected from severe weather, but is not well drained. There is a basement about nine feet deep, for the storage of wood and coal, under the east end of the building, which is fairly dry. There is no basement under the west half. The ground under the floor of that part is damp. The foundations are brick. The walls take up water from the earth by capillary attraction.

On the subject of damp walls, as the result of absorption from the ground, it may be as well to say a word here, once for all. Mr. Wm. Easie, in an excellent little book, published at London, on the subject of "Sanitary Arrangements for Dwellings," speaking of a house designed by himself, says: "Allowing for the lime, sand, and water, the space taken up by the walls is about 54,000 cubic feet. The foundations under the ground-line occupy about 8,000 cubic feet, and represent 115,000 bricks, presenting an upright surface of about 5,000 superficial feet to the damp or possibly wet earth. Under favorable circumstances, the foundations of a house of this size up to the ground-surface will at first contain about 5,000 gallons of water; and if the subsoil is very humid and the bricks poor and porous, the latter will absorb and retain 7,000 gallons. * * This wet will be continually striking up into the walls of the house above ground—by capillary attraction. * * Dampness from this source has several times been traced up to thirty feet in height above ground." The day I visited this school building, the eye could trace dampness on the outer wall, in some places, to the height of twenty feet at least. I have no doubt that the walls of the building, from the base to twenty or thirty feet above ground, contained not less than 5,000 gallons of water. Occupation of a house in such a condition is a good deal like sitting in wet clothes. The simple remedy is a layer of slate or glazed brick above the ground line.

The privies, about four rods from the building, were not clean, not at all disinfected, and were filled with sewer-gas. This poisonous organic vapor was not wholly generated in the privies. There was eighteen inches of night-soil in the bottom, below the opening of a six inch pipe connecting the privies with the street sewer.* These pipes were not trapped and through them gas entered from the town sewerage. The faint death-odor of organic vapor arising from the putrefactive fermentation of excreta pervaded the temples of Cloacina and warned the experienced and the wary not to enter. Every day, for a brief period, the helpless children have to breathe this poisoned atmosphere. It is simply barbarous to subject them to any such peril and sickening discomfort. The remedy is very simple and not at all expensive. The pipes leading from the vaults should be trapped and ventilated between the traps and the street sewer.* No gas could then escape on the premises from the great underground reservoirs of the town. Flushing every day with hose from a hydrant, would cost the janitor but little work, and thus a wholesome cleanliness could be preserved. What is said here on this disagreeable subject is applicable to all the public school buildings in town, but two or three.

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*Since the above was written, fourteen cubic yards of night-soil have been removed by the scavenger from these vaults and transported to the land beyond the city limits.

Ventilation in this building is almost entirely by windows. Hence there are "drafts" especially dangerous to the sensitive organizations of young children.

The heating is by stoves, which take up needed room, cause dust and dirt, require attention that interrupts school work, roast the chidren sitting near, while others sitting farther off are compelled to suffer with cold. Further on I shall have more to say on the subject of warming school buildings.

The lighting of this building is defective, but not so bad as that of several others.

The janitor complained that the roof leaks somewhat and that the water occasionally stands on some parts of the grounds.

The building is old, and in many respects unwholesome. The privies are a positive nuisance to be abated as soon as possible. My advice is that the building be torn down and a good school-house, with proper heating, lighting and ventilation, be built on the same site, which would be excellent with proper drainage. Take the next ten years, the expenditure of keeping the old building in repair would perhaps equal the cost of erecting a new one.

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*There is another way, perfectly safe and cheap. Let the vault be lined with a heavy impervious coating of hydraulic cement. The bottom of the vault should be constructed sloping from all sides to a lowest point. At this point insert a brass socket, two, three, or even four inches in diameter, as circumstances may require, which socket opens into a tight drain-pipe, of ample size, leading to a public sewer. Into the socket a ground brass plug, fitting water-tight and gas-tight, should be inserted. Then with a hose, or by opening a hydrant, let water into the vault to a depth of twelve or fifteen inches. The vault is then ready for use by the children during the day. When the school is dismissed at night, the janitor can pull up the plug, by means of an attached chain, and let the contents flow entirely away. The chain should be locked up, so that the children cannot meddle with it. The excreta, even during the hottest days of summer, would not pass into putrefactive fermentation during the few hours from the assembling of a school in the morning to its dismissal at evening. Consequently no sewer.gas would be generated. The tight-fitting plug would prevent the ingress of gas from the public sewer. There would be no accumulation of filth; consequently there would be no outlay for its removal.

The Commissioner went from the Fourth to the Fourteenth school. The change was from one of the worst, not the worst, to the best. The transition was from the past to the present, from a period of comparative ignorance and make-shift to a period of developed science. The serene faces, the rapid work, the quietude, the happy look, the vivacity of eye and features in the pupils, indicated wholesome sanitary surroundings. A building dry from basement to dome, well lighted, well ventilated, properly warmed without cross currents of air through the rooms, with even temperature, comfortable for all pupils at all hours of the day, and in all seasons of the year, fulfills the most requisite conditions of a model sanitary school-house.

The heating is by low-pressure steam, which in my judgment is the best of all agents for securing wholesome warmth in large buildings. The expense is the greatest objection. The apparatus costs considerable at the outset, but the subsequent expense is not much, if any, greater than the expense of heating by stoves. I noted the number of tons of coal burned in the different buildings during the past season and found that the amount of fuel consumed in the Fourteenth District school-house was very little greater than elsewhere.

The ventilation, which is connected with the heating, is admirable. Yet I discovered two or three defects, which it is necessary to point out. The shafts whereby the vitiated air is carried off run through the warm air chamber, from which the pure atmosphere is conducted to the different rooms. These shafts, to save expense, were made of boards, and consequently leaked through the pores and joints, mingling to a certain extent foul with pure air. The evil would be remedied if the shafts were made of galvanized iron. They would then be impervious and no such evil would result. The play-rooms in the basement were not ventilated at all, except by windows, which is a great defect in so fine a building. The cement floors of the play-rooms are too dusty and should be covered with wood.

And the urinals emitted a bad odor, which a solution of crude sulphate of iron (copperas), one pound to the gallon, used* as a disinfectant, could easily remedy. Would that all the school buildings in the city were as wholesome as this!

The Third District school house is still in the hands of the architect. It is like the Fourteenth, without the defects already pointed out. When completed it will be the finest school building in the city, from a hygienic point of view, as well as in other respects.†

The next school building inspected was the Tenth. There we find nearly all the objectionable features of the Fourth District building repeated, and some of them intensified. The site is especially exposed to northwest winds, which the poor little boys have to face in winter to reach the outhouse. The heating is by stoves and there is no ventilation except by open windows. In some of the rooms the stoves emit volumes of choaking coal gas. One of the lady teachers expressively remarked that sometimes in winter there is no alternative between freezing and suffocation The privies are connected with the town sewerage by open pipes, through which flow back poisonous organic vapors, making them filth temples of the most diabolical kind.* The grounds are below the grade of the sidewalk, and, not unfrequently, are halt covered with water puddles in which the little fellows delight to paddle. The basement is damp and its floor is an unwholesome expanse of wet earth. An insufficient half-inch pipe carries drinking water to the halls of the three stories, and the waste-pipe is not only without traps but empties loosely into the open end of a three-inch drain-pipe in the basement, through which the poisonous gas is poured into the whole building. If all these contrivances for unwholesomeness had been made with full knowledge of the results, the inventor would have put King Herod to shame for pure devilishness. The only excuse for it is utter oblivion of sanitary conditions.

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*The architect describes the water-closets of this model school house as follows:

"Water-closets in school buildings are certainly a great convenience, especially to the small and feeble pupils in cold and stormy weather, provided, always, that they are thoroughly and well ventilated, which I claim has been accomplished in this building. Near each and adjoining the two main ventilating shafts are two heat shafts, one for each of the water-closets, being 16 by 42 inches, with the only opening thereto from the bottom of each shaft to the water-closets. From this opening galvanized iron ducts are run, one to each row of water closets. The area of each duct is about half the area of the shaft. From this duct a five inch diameter tube is run to inside of water-closet enclosure, and for the purpose of creating a motion of the air in these shafts, we have a medium sized cast iron stove for each shaft, set in a brick chamber with close fitting iron doors. The heat generated in the stoves, and from smoke pipe is likewise conveyed and discharged into these shafts, thus creating a strong upward current; and while all the air in the shafts must come down through the seats of the water-closets, all the air necessary for combustion in the two stoves is forced or drawn through the same source. Each separate water-closet is properly trapped, and from the head of each trap is a 1¼ inch lead pipe leading into main in each shaft and out of the same. The sewers to this building are also ventilated by the two conductors in front of the building, which connect directly with the same, and all the joints of drain are well cemented. With these arrangements, we feel safe in asserting that there will be no tronble from sewer-gas in this building. The stoves are fired whenever needed for the purpose of ventilating the water-closets and basement. The air in the shafts rises with an average velocity of 12 feet per second. The area of each shaft, exclusive of smoke-pipe, is about 4 square feet and 4 inches. This will make a discharge of a little more than 3,000 cubic feet of air per minute, and allowing about one-third for friction, we would still have about 2,000 feet of discharge per minute, which changes the entire air in each water-closet once in four minutes. The velocity was determined by an accurate anemometer in the shafts and at each closet. The difference in velocity at the different closets was so trifling that it is hardly worth while considering."

†The building is now completed and does not entirely fulfill expectation, owing to a false economy in heating and ventilating.

Yet the building is substantial, and could easily be transformed into an excellent school-house. The grounds should be thoroughly under-drained; the basement should be made three feet deeper, and the bottom cemented. Apparatus for heating with low pressure steam and good ventilation could then be introduced. There is water in the adjoining street, and a sewer. Eight or nine thousand dollars in the hands of honest men who understand the principles of sanitary engineering, would be sufficient to make the Tenth District school building nearly equal in wholesomeness and comfort to the Fourteenth.

The Thirteenth is new and almost a model building. It is conconstructed on the same plan as the Fourteenth and Third. The grounds, however, are not yet completely graded and connections are not made with the water-works and sewerage. The hill where the building stands is "springy," and those who have charge of the grading should see that the grounds are properly under-drained. And I noticed that the foul-air flues, which pass through the warm-air chamber, are still more defective than those in the Fourteenth District building. They are constructed of boards, in which there are knots, shakes and cracks. This accounts for the complaint made by the teachers in all the rooms that the air is not quite pure without the opening of windows. It is to be hoped that the water pipes and sewers will be extended to this fine building as soon as may be.*

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*Since the above was written, 57 cubic yards of night-soil have been removed from the vaults and sent out of the city. From the vaults of the Branch School of this District, on Centre street, 16 yards have also been removed.

The Ninth District building was next examined. Here all the unsanitary conditions of the Fourth and Tenth are repeated. The outlying filth-temples† with the careful introduction of sewer-gas, the everlasting gas-generating stoves, and ventilation by open windows, are again met with, but fortunately the basement is fairly dry. One room was so crowded as to give only forty-five cubic feet of air to the scholar. It is not quite so bad as the famous Calcutta Black Hole, or the misfortune and misery of the poor little ones assembled in it might long since have been ended.‡

The building is old and it would hardly pay to undertake its transformation into a decent school house. The Ninth Ward needs a new building, modeled after the Third, Thirteenth and Fourteenth.

The Sixth District (Humboldt) school-house is in some respects one of the worst in the city, yet it might easily be made very good. The site is sunny and sheltered. The large yard slopes attractively to the east and is beautifully graveled. It is disfigured, however, by a pair of filth-temples,§ into which the poisonous organic vapor flows freely from the town sewerage. They are both foul and emit an odor that disturbs passers on the street. The basement is low and filled with rubbish and mud. Water oozes from the high ground to the west and stands in pools on the uneven surface under the building. A drain-pipe runs from one of these pools, or springs as the janitor calls them, to a privy and allows the uninpeded ingress of sewer-gas. The rooms are heated by stoves and there is no ventilation except by open windows and doors. Nearly all the rooms are over-crowded.

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*Since the above was written, 61 cubic yards of excrementitious water have been removed from the undrained out-door vaults of this excellent building. This nuisance unfortunately must continue till the excellent water-closets, constructed in the same way as those of the Fourteenth District School, can be connected with the sewer and water systems of the city.

†From the vaults in this building 49¾ yards of solid excrement have been removed.

‡A very considerable addition has been made to the building since the above was written and it will not henceforth be so crowded.

§These have not been cleaned, but from the branch school of this District forty-six yards of excreta, the foul accumulation of many years, have been removed.

The basement might be lowered several feet, the rear foundation wall might be relaid in hydraulic cement, an area might be dug on the west, north and south sides of the building, under-drainage might be carried through the grounds, the bottom of the basement thus made dry might be well covered with cement, and heating and ventilating aparatus might then be introduced as in the Fourteenth District building. The consequent removal of stoves would give additional floor space. Odorless water-closets would then, of course, be constructed in the basement. Where the unsightly nuisance, called a privy, now stands on the south line of the yard, a pavilion might be erected for a Kindergarten department, which would relieve the main building, thereby giving ample space. All of these improvements would cost twelve or fifteen thousand dollars, but the school would then be worthy of an enlightened neighborhood, and the blessing of Heaven would soon be written in the happier faces of the children and teachers.

The Commissioner of Health is sorry to feel obliged in conscience to pronounce the Second District (Webster) school building a public nuisance. The basement is wet from overflow of surface water and the walls are damp. Gas flows from street sewerage into privies* one of which stands within a few feet of the building and emits its foul odors and poisonous vapor into the open windows of unventilated school rooms, sickening the pupils and teachers. In some of the rooms ventilation is impossible, even with open windows, in summer. Some of the rooms are dark and nearly all of them cheerless. There is not a room in the building that is not positively bad from one cause or another. Two steep, narrow stairs lead to the second story, down which the little unfortunates would tumble in "heaps of ruinous mortality," in case of panic from alarm of fire. In my judgment it would not be a wise expenditure of money, to attempt any remodeling of the present structure. The populous Second Ward needs a new, capacious and model school building.

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*From the vaults of the privies belonging to this building, thirty-one yards of filth have been removed, to the great relief of the inmates. Other improvements have also been made.

The Jefferson school building in the same ward, is much larger and may be transformed at an expense of ten or twelve thousand dollars, into a comfortable and wholesome educational structure. The rooms are lighter and better arranged. The basement and privies,* are in quite as bad a condition. Similar improvements to those suggested for the Tenth and Sixth Districts might be introduced, to the great relief of a thousand children and a large corps of faithful, hard-working teachers.

The Seventh District school house is old and hardly worth remodeling. Heating by stoves, ventilation by windows, foul privies† with gas from the street sewer, defective underdrainage, etc., make the building quite as worthless as that in the Fourth District. The wealthy Seventh Ward should keep pace with the Third Ward by erecting a model public school house.

The condition of the Fifth District school building is not essentially different. The privies‡ are especially bad—the floors dangerously weak, the walls caving in, the waste pipes running to street sewers without traps or ventilation. A street is to go through the south side of the yard, which will leave no play ground. The building is not worth spending any money on. A new and more commodious site should be chosen and a proper school building erected.

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*From these vaults eighteen yards of excreta have been removed.

†Since the above writing, twenty-four yards have been removed from the vaults of this building.

‡Here twenty-eight yards have been sent away.

The Eighth District school house has the same faults of heating, ventilation, dampness of basement and foulness of vaults* described in so many others. The vaults, however, do not connect with the street sewerage, consequently are not so badly filled with poisonous organic vapor. By way of compensation for this defect in unsanitary condition, there is an untrapped pipe leading from the basement into the public sewer, through which gas finds its way into the whole building. With considerable expenditure of money for underdrainage, lowering and cementing basement, introducing fixtures for low-pressure steam heating and proper ventilation, the sanitary condition of the building might be made good.

The Eleventh District school house has eight ill-ventilated, badly heated, over-crowded rooms. Fortunately for the dirty privies† they have only their own soil to generate sewer-gas and consequently are not so poisonous as many others. The basement is damp and the grounds are narrow in a region where lots are cheap. The building might be enlarged‡ and remodeled in the same way proposed for other school houses and serve a good purpose for many years to come.

The Twelfth District school house is a capacious and noble structure. Yet the heating is bad, the ventilation worse, and the basement worst of all. The privies§ are foul but fortunately are not connected with the great poisonous collection of organic vapor in the town sewers. As if in defiance of all sanitary law, a six-inch drain pipe connects the wet, muddy basement with the street sewer, conducting into the whole building the dangerous gas. It is a shame to see so fine a structure thus defiled. With under-drainage of grounds, pavement of the basement with cement, and the introduction of low pressure steam heating and good ventilating apparatus, this school house would be something for the city of Milwaukee to be proud of.

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*Here no cleaning has been done.

†From them 52 yards of filth—a long accumulation—have been removed.

‡An addition has been made during the past season.

§From these privies 72 yards of excreta have been removed, the vaults filled up, and well ventilated water-closets constructed in the basement.

Everything that has been said of the Twelfth may be said of the First District school building, except that the latter has no unsanitary connection between the basement and the town sewerage. The same improvements are here required as in the Twelfth, when the fine new building, although not so large, would be equally commendable.*

The High School building stands on elevated and dry ground, and while there is nothing positively bad about it, needs the introduction of proper heating and ventilating apparatus.†

In view of these details in regard to the different school buildings, certain general sanitary facts and principles may be stated.

Sewer-gas is a subtile, invisible poison, that should be kept out of all places frequented by human beings, especially by school children. It is by no means so offensive to the nostrils as sulphureted hydrogen, with which all are familiar. The latter is a dog that barks more than it bites. The former is a dog that barks but little yet bites to kill. The vaults described above as in a foul and poisonous condition, should receive attention from the proper authorities without delay. The means of curing the evil are simple and not expensive. A section of the drain-pipe, near the out-house, should be taken up and a water trap put in its place.‡ Below the trap, that is, on the side towards the street-sewer, a ventilating pipe should be inserted and carried above the roof into the open air, remote as possible from the school building. This ventilating pipe will prevent the trap from being emptied by syphon action and will carry off the gas rushing in from the sewers of the town. Then the vaults should be daily flushed with an abundance of water from a hydrant. A simple disinfectant should also be used daily. Twenty-five pounds of copperas may be obtained for fifty cents, which will make a barrel of solution. One gallon of this solution poured into the urinals and vaults each day will keep them odorless—only the janitor must have a locked cover on the barrel to keep the children out of the poison.

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*From the privy vaults of this building 64 cubic yards of human filth have in the mean time been removed, also 8 yards from the Branch School.

†Since the above was written, the privies have been discontinued and additional water closets constructed in the basement.

‡See the note on previous page for another method of remedying the evil.

No animadversion can be too strong for neglect of duty in this regard. I have done my whole duty in making laborious investigation to discover these great nuisances and in pointing out the way to abate them without large expenditure. Now let the Board of Public Works, the School Commissioners and the Common Council do their duty.* Whoever would obstruct the abatement of these nuisances ought to be incarcerated in a Hindoo *avaskara mandira* (filth temple), and left there till he learns the ancient Sanskirt language well enough to translate the whole *Mahabharata* to the satisfaction of Max Muller.

Ventilation by opening windows is dangerous. It is bad enough in a private house or office, where the inmates have the liberty of movement and can get out of a cold draught. In a crowded school room, where the children must sit still and take what comes, it is sometimes absolutely cruel and perilous to health or even to life. Yet ventilation must be had. A human being can live nine days without food, but not half as many minutes without air. In many a packed school room there is no alternative in winter but suffocation or a freezing blast from an open window. It must be remembered that the breathing of air consumes its oxygen and replaces it with carbonic acid. When this change reaches ten per cent., fatal suffocation inevitably follows. "But," says Professor Huxley, the very highest authority, "the deprivation of oxygen, and the accumulation of carbonic acid, cause injury long before the asphyxiating point is reached. Uneasiness and headache arise when less than one per cent. of oxygen of the air is replaced by other matters; while the persistent breathing of such air tends to lower all kinds of vital energy, and predisposes to disease. Hence the necessity of sufficient air, and of ventilation for every human being.

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*The Commissioner of Health has the satisfaction to know that, as a direct result of his persistent effort, full five hundred tons of excreta have been removed from the vaults of privies belonging to public school buildings. More than half a ton of sulphate of iron has been used to disinfect the same.

To be supplied with respiratory air in a fair state of purity, every man ought to have at least eight hundred cubic feet of space, which ought to be freely accessible, by direct or indirect channels to the atmosphere."*

Yet the average space to the individual in Milwaukee school rooms is considerable less than two hundred cubic feet. In some rooms it is less than fifty cubic feet.†

The combustion of coal in stoves also‡ consumes the oxygen of the atmosphere in school-rooms. I found the complaint universal among the teachers, that the stoves emit coal-gas, poisoning§ the air. Besides, they overheat one part of the room, and leave the remote part very cold in severe weather.

If the Common Council will go to almost any school building in the city, they can find rooms containing less than one hundred

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"*It might be inferred from the physiological evidence of the paramount importance of proper aeration of the blood, that the breathing of air rendered impure from any cause is hurtful, and that the highest degree of health is only possible when to the other conditions is added that of a proper supply of pure air. Experience strengthens this inference. Statistical inquiries on mortality prove beyond a doubt that of the causes of death which usually are in action, impurity of the air is the most important. Individual observations confirm this. No one who has paid any attention to the condition of health, and the recovery from disease of those persons who fall under his observation, can doubt that impurity of the air marvellously affects the first, and influences, and sometimes even regulates, the second. The average mortality in this country increases tolerably regularly with density of population. Density of population usually implies poverty and insufficient food, and unhealthy work; but its main concomitant condition is impurity of air from overcrowding, deficiency of cleanliness, and imperfect removal of excreta, and when this condition is removed, a very dense and poor population may be perfectly healthy."—Dr. Parkes, Practical Hygiene, 1878, p. 94.

†"In a boys' school with 67 boys, and 4640 cubic feet (=69 cubic feet per head), Roscoe found 3.1 parts of carbonic acid per 1000. In Leicester, in a room with six persons, and only 51 cubic feet of space per head, and with three gas lights burning, Mr. Weaver found the carbonic acid to be 5.28 parts per 1000; while, in a girls' school-room, (70 girls, 10,400 cubic feet), or 150 cubic feet per head, Pettenkofer found no less than 7.230 parts per 1000. In many schools, work-rooms, and factories, the amount of respiratory impurity must be as great as this, and doubtless a constant unfavorable effect is produced on health."—Dr. Parkes, Practical Hygiene, 1878, p. 103.

‡The burning of one pound of coal requires about 240 cubic feet of air. The burning of one pound of dry wood requires 120 feet of air.

§Coal in combustion gives off, (1) one per cent. of carbon dust and tarry particles; (2) carbonic acid; (3) carbonic oxide; (4) from ½ to 6 or 7 per cent. of sulphur in the form of sulphurous and sulphuric acid; (5) carbon bisulphide; (7) ammonium sulphide; (8) ammonium carbonate; (9) sulphuretted hydrogen; and (10) aqueous vapor.

cubic feet of air to each person. Let them select a winter month, and sit down there six hours a day for three weeks, with a sanitary primer in hand. As soon as they feel a sense of suffocation and its attendant headache and depression, let a window be opened on their backs. If a cannibal propensity should be developed in the mean time, as well it might, the city fathers in a remote corner might compensate themselves for half frozen feet, numb hands and chilled blood, by feasting on a brother alderman roasted to a turn near the "Cincinnati heater" in another corner.

I have no wish to jest with, still less to vituperate, other members of the city government. My only desire is to communicate important facts in language that will impress the imagination and thus reach the judgment and conscience of citizens who have the power to mend a great public evil.

I have herein recommended improvements, in the remodeling of old school houses and the building of new ones, which, if carried out, would involve the expenditure of two hundred thousand, perhaps two hundred and fifty thousand dollars. The amount seems large and is large. But let us look at the question coolly from a mere business point of view. The cost of educating a child at school,—food, clothing, home care, tuition,—all things included, is not less than one hundred and fifty dollars a year. The unsanitary condition of our school buildings neutralizes the work of education to the extent of at leasf one-third. The foul air of school-rooms, the unequal heating, the poisonous sewer-gas in the outhouses or in the buildings, cause depression, loss of energy, nervous irritability, dullness of brain, waste of time from ill health, etc.,—which increases the friction and slackens the speed of educational progress more than thirty-three and one-third per cent. But call the loss one-third, which is certainly a minimum. Now, one-third of the yearly expense of one hundred and fifty dollars is fifty dollars. The number of children at the public schools in the city is about 12,000. The loss on the whole number, therefore, amounts to the enormous sum of six hundred thousand dollars a year. This loss falls upon the parents of the children, distributed throughout the city. A less sum than one-half this loss for a single year would put the school buildings in a good sanitary condition for ten years to come. The resulting gain in educational power by the expenditure of a quarter of one million would amount during the decade to six millions.

And this is not all. The habit of dullness, begotten by the unsanitary conditions herein pointed out, lasts during life, and more or less cripples the productive energy of a whole generation of citizens. Moreover, this vital question touches the pride and hope of almost every household. We must also reckon the cost of increased sickness, and a larger percentage of death. It seems heartless to dwell upon the economic side of the great and important problem. Above all, and beyond all, are human suffering, constitutions broken for life, seeds of disease early sown, pain too deep for tears in the panting breast of many a little one, the heartache of parents, the shroud, the emblems of mourning, the solemn "dust to dust" and "ashes to ashes" closing blighted careers which sanitary wisdom might have prolonged over the customary years of usefulness.

The answers of the principals suggest many important topics for discussion, but I have space left for the mention of only one more. Light in school rooms should be abundant, and come to the pupil from the left side or over the left shoulder. All experienced students know this. In many of the school rooms I saw the children facing the light, the glare of which causes headache, restlessness, and irritability of brain; and it sometimes seriously injures the eye. The evil in most instances can be remedied with a little trouble and no expense.

THE MEAT SUPPLY OF MILWAUKEE.

"Whilst, on the one hand, it may be freely conceded to the advocates of Vegetarianism that a well-selected vegetable diet is capable of producing (in the greater number of individuals), the highest physical development of which they are capable, it may, on the other hand, be affirmed with equal certainty that the substitution of a moderate proportion of animal flesh is in no way injurious; whilst, so far as our evidence at present extends, this seems rather to favor the highest mental development."—DR. CARPENTER.

THE MEAT SUPPLY OF MILWAUKEE.

There are in the City of Milwaukee 234 meat-markets. Nearly all of those who sell meat, also slaughter on their premises. Some kill but a few animals for their own limited retail trade. Others slaughter hundreds, even thousands, each working day during a portion of the year. Most of the vendors of meat in this city are respectable men who are anxious that the trade should not be injured and brought into disrepute by the delinquencies of a few.

During the past season the Health Department has entertained complaints against 26 butchers. The greater part of this number have complied with the laws regulating their business, without controversy or murmuring. A few have resisted, or attempted to evade, the Health authority and seven have been prosecuted. Six out of the seven have been convicted and have paid penalties inflicted by the court. The publicity of a trial for selling unwholesome meat, or for keeping an unclean market, has been a much greater punishment than a fine imposed by law. There have also been 54 confiscations of meat, aggregating several tons. Veal under the prescribed age of four weeks, tainted beef or mutton, rotten sausages, and decayed hams, have been seized, whenever and wherever found, covered with kerosene, and sent away by the public scavenger to offal heaps beyond the city limits. Slaughter houses have been ordered to be cleansed, and the proprietors of great packing establishments have been required by the Health Department to introduce costly machinery in order to prevent the escape of vapors distressing to wide neighborhoods. Never before in the history of the city have the people had so little cause to complain of the places where they purchase their daily supply of animal food.

The encouragement and support of at least 200 out of the 234 dealers have sustained the Commissioner of Health in a trenchant work of much needed reform. The press has helped forward the good work, by giving publicity to prosecutions and other restrictive measures, till the wicked vendors of immature and diseased animals for human food have sought other markets with their unwholesome products. The tanners declare that the weight of calf-skins in this city has increased by forty per cent., during the past summer. The people rejoice and the public health has been improved.

And yet more remains to be done than has already been accomplished. The slaughtering of animals should never be tolerated in large cities. The driving of animals through the streets is itself a nuisance. The pens, in the rear of the butchers' shops, where cattle, pigs, sheep and calves are kept till their proprietors are ready to kill them, are frequently noisy, and always more or less offensive to the sense of smell. Not unfrequently, the slaughtering is done in view of upper windows from which it is witnessed by women and children. The cry of animals, destined to the shambles, is unpleasant to the ear and distressing to the imagination. It is difficult to remove, especially in summer, the blood and offal of slaughtered animals without leaving an odor that is at once offensive and deleterious. When the weather is hot, the refuse of butchering places is sure to taint the air before the expiration of the prescribed twenty-four hours, within which the law requires it to be removed. Sometimes it is hidden in a shed or dark alley, till the stench of it drives the neighbors to the Health Office for protection or redress. And the vile carion must be drawn along the streets, either by night or in the day time. Besides, the thrifty butcher tries out the scraps for tallow or grease, giving the unfortunate neighborhood the sickening benefit of rendering in open kettles. The spilled blood and filth are at best washed into the public sewers, adding to the organic matter that undergoes putrefactive decay and generates noxious gases. Sometimes they are allowed to run through defective floors or directly on to the ground, where they slowly accumulate and poison the earth. Now and then, if avarice, ignorance and apathy are uncontrolled, an adjoining hog-pen with its unclean, offal-fed swine, increases the nuisance. When the proprietor does his best to keep his place in a neat and wholesome condition, the very nature of the business stamps it as an "offensive trade." There is always waste of material and time.

A meat-market need not be more offensive or unwholesome than a grocery. It is the slaughtering part of the place that creates a nuisance. The sight of good, clean butchers' meat is far from being repulsive. The slaughtering should be done outside of the city, and the sides of beef, carcasses of sheep, lambs, swine, calves, etc., should be brought by dealers to their markets, where the people can be served with exactly the same convenience as at present.

In my judgment, the 200 respectable butchers of Milwaukee would find it more economic to combine their interests, so far as slaughtering is concerned, and provide for themselves a place in common beyond the confines of the town. Co-operation and aggregated capital would secure conveniences which few individuals can command. Modern appliances and improved machinery might then be secured. All the profits of extracting glue from the feet, of manufacturing fertilizers from blood and offal, of rendering grease from refuse parts, of utilizing hoofs and horns, of preparing tripe and souse, of making sausage for distant markets, of curing bacon and drying beef away from the dust and gases of the crowded city, of salting hides, etc., might then accrue to the ownersnip of the great slaughtering place, or abattoir. The cost of bringing the meat to the markets would be less than the present cost of driving animals, by squads, to enclosures where, too often, they are barbarously slain by unskilled hands and avenge their wrongs upon apathetic community by contributing to the causes of disease and death. The great "stink factories" in the neighborhood would then be closed for want of material on which to feed.

Not only would the butchers find the plan economic, but real estate in the vicinity of every place where slaughtering is now done would be enhanced in value. It is indeed necessary to supply the people with meat, but the supply should not be at the cost of discomfort to many and the depreciated value of homesteads. The supply can be cheaper without nuisance than with it.

But some, who have not studied the question, will naturally ask whether a great slaughtering establishment, such as is here proposed, would not create a colossal nuisance, sending its sickening vapors over miles of country, infecting the whole neighborhood, perhaps damaging the meat before it could be removed to clean shops in the city. Many of our people might well propound such a question, who have for years experienced the discomfort of odors floating over the adjacent hills from the packing-houses in the Menomonee Valley. An abattoir properly constructed, properly conducted and supplied with proper machinery, will make no nuisance at all. In order to substantiate my statement, I will quote a description of Brighton Abbatoir from a pamphlet sent to the Paris Exhibition by the Boston Board of Health. This description has received the full endorsement of the State Board of Health of Massachusetts. It will also afford a fuller and perhaps clearer notion of the slaughtering establishment proposed for this city. It will also demonstrate to our citizens that responsibility for the discomfort caused by the smells from packing-houses in Milwaukee belongs to the proprietors and is not a necessary incident of the business.

BRIGHTON ABATTOIR.

"For convenience in caring for the blood and offal, the plan of slaughtering on a raised floor, above a basement story, was adopted. This floor is of double plank, calked, and well laid on beams, with a slope to an iron gutter running across the centre of the floor, which receives the blood, and conveys it to iron wagons in the basement, which has a floor of asphalt. Several trap-doors in the floors of the slaughter-houses receive the heads and feet, hides,tallow, and offal, each dropping into separate iron wagons below. The various wagons, as often as filled, are wheeled into the rendering house; the hides being salted in the basement, and the blood, offal, heads, fat, and tallow, being raised to the rendering-tanks and driers by means of elevators.

"In most of the buildings, the cattle are hoisted for dressing, by steam power, through shafting connected with the engine in the rendering-house, to which the necessary pulleys are attached; although in some of the buildings the old method of hoisting by hand, with the wheel and rope, is still carried on.

"Hot and cold water are supplied to each slaughter-house, and the floor and walls of each house are thoroughly washed at the close of each day's killing. The water, in abundance, is the only disinfectant used, even in hot weather.

"Connected with each house is a refrigerator, in which all cattle are placed after having been dressed. They are allowed to remain from several days to a couple of weeks before sending to market. These refrigerators vary in their capacity; those attached to the smaller houses furnishing space to hang sixty cattle, while in some of the larger houses as many as two hundred can easily be stored. The arrangements for slaughtering sheep and disposing of the blood and offal are substantially the same as above described for cattle.

"In the rendering-house are placed, in the fifth story, two large iron water-tanks, each holding about fifty-eight thousand gallons. These tanks are filled by steam-pumps in the engine-room, and are connected by distributing-pipes with nearly all the buildings and yards on the premises; also with several hydrants, for use in case of fire. The rendering-tanks are suspended from the floor of the fourth story, and are filled from that story with the offal, heads, and tallow contained in the small iron wagons coming from the basements of the slaughter-houses. Different tanks are used for the various processes of making tallow, fertilizers, etc. After the contents of the rendering-tanks are sufficiently cooked, the fat is drawn off and packed. The residuum from the tanks in which bones and intestines are cooked, the scraps, or what remains after being pressed, are put into the driers, which are located in the second story, but are filled through pipes leading into them from the third story floor. The blood is also put into the driers here, after having been partly dried in the tanks. The contents of the driers are subjected to steam-heat, by means of revolving sets of steam-pipes inside of them, for several hours, until the water has been sufficiently evaporated; when they are discharged upon the second-story floor, and after being passed through a mill, to grind any particles of bone that may not have become sufficiently fine in the process of cooking, are disposed of as a fertilizer. This fertilizer is made by mixing together the dried products of rendering the bones, intestines, and blood. In the large building in the process of construction, sulphuric acid and other chemicals are to be added, in varying proportions, to be adapted to the needs of various crops, and to suit the demands of different soils.

"The feet are cooked in the third story, to extract the neat's foot oil from them; and the tallow, grease, oil, shin-bones and hoofs are stored in various parts of the building.

"The steam and offensive gases from the rendering-tanks and driers are received into a large iron vessel, through which cold water is continually passing, where the steam is condensed; the offensive gases pass on into a large pipe, from which they are drawn by a fan. The aqueous vapor having been condensed and left behind, the gases are mixed with large volumes of air by means of a patent blower, and then pass under the furnace fires to be consumed.* The furnaces are so arranged, that when the fire is low, or when fresh coal is added in any one the gases can be directed under another furnace where the fire is burning briskly, so that complete combustion is always accomplished; and there are no offensive odors at any time, although such a large mass of animal matter is constantly treated day and night.

"The tanks in which the offal is cooked for a varying number of hours, depending upon its character and use, have at the end of that process a certain amount of water in them, containing in solution and in suspension a certain amount of gelatine. This is called soup; and that which comes from boiling the heads and the feet is still further boiled down for the purpose of making glue, which finds a ready sale in the market; the rest of the soup is thrown away.

"The best portions of the fat are tried out for making artificial butter. The shin-bones are sold for knife-handles, etc.. The hoofs are manufactured into various articles of use and ornament. The offal removed from the stomach and intestines is carted away from time to time, to be used as manure.

"All offal and blood are rendered and dried immediately while fresh and untainted. The plan of elevating the slaughtering-rooms, so that all blood, offal, etc, may be dropped into the wagons in the basements, renders the labor of keeping those rooms clean comparatively easy. This, as well as the system of receiving the products of slaughtering in iron wagons, and raising them on elevators to the tanks and driers, has proved very satisfactory.

"The method adopted for the destruction of the gases after rendering prevents any offensive odors arising therefrom. It requires and receives constant and careful attention by day and night; and the experience of the past four years and a half has proved the possibility of carrying on a large slaughtering and rendering establishment without offense or annoyance to the community around it.

"During this time there have been slaughtered 282,857 cattle, and 1,321,573 sheep, an average of nearly 63,000 cattle and 294,000 sheep, each year. The fertilizer manufactured from the blood and offal from this slaughtering, has ranged from 1,200 to 1,500 tons a year. The expense incurred for the purchase and preparation of land, for erecting buildings, and for providing machinery necessary to carry on the business, has been about $630,000."

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*The gases should be mixed with four times their volume of air. In one of the large packing-houses of Milwaukee, where 1000 hogs are slaughtered daily in winter, there is no provision for burning the gases. In another, where 700 hogs are slaughtered daily, a very ingenious contrivance has been made for condensing steam from the tanks and forcing the gases into the fire under the boilers. The conductor for the gases is only four inches square and there is no provision for mixing air with them. The arrangement does much good but it needs a great deal of improvement. In still another, where 4000 hogs are daily slaughtered during the packing season, an old rendering tank, through which cold water flows, serves as a condenser, from the top of which a two-inch pipe, to carry off the organic vapors, runs to the burning coals in the furnace. This contrivance is much better than none, but it is very far from being efficient. The proprietors of these packing establishments have promised the Commissioner of Health to make any provisions that he my require, at the close of the present season, for consuming the gases that have been a source of anoyance to citizens for many years. Nothing less will content the Health Department than an arrangement that shall come up to the standard of Brighton Abattoir. The cost will not be great and the public have rights which must be respected.

Thus it appears from high authority, attested by experience, subjected to the criticism of enlightened Europe, that the business of slaughtering for a large city may be so conducted in a single establishment as to cause no offense to a densly populated neighborhood. In fact, the economic and sanitary advantages of abattoirs are so obvious and well established that their use has been made compulsory in the most intelligent and refined communities in all the civilized parts of the world. The magnificent new abattoir at Berlin in Germany, is superior in some respects to the Brighton abattior at Boston in this country. With such appliances, machinery and regulations, slaughtering might be done in the heart of the city, without detriment to health or offense to the senses. Other considations, however, which will presently appear, make it better that such an establishment should be located beyond the limits of the corporation, where land is cheaper, the cost of drainage is less, the handling of stock is easier, and the space for traffic is not so much obstructed.

The packing-houses should be removed from the city, and placed in proximity to the abattoir, indeed should constitute a part of it. Individual interests might be kept distinct from corporate interests. Whoever takes a comprehensive view of the great North-West, whoever traces on the map the long lines of railroad centering in this city and stretching away to the boundless fields of Wisconsin, northern Iowa, Minnesota, Nebraska, and regions beyond, will come to the conclusion that the packing business here is still in its infancy. Where thousands of swine are daily slaughtered now, tens of thousands will be slaughtered a few years hence. The business cannot much longer be confined to the Menomonee Valley, in the heart of our growing city. It is the part of wisdom to make early provisions for the future. The valuable machinery may be removed from buildings now in use and transferred to a more desirable locality. The abandoned structures might be transformed into factories for the various manufactures of lumber, without serious loss. The sluggish river would then be relieved of a vast influx of unwholesome organic matter and the problem of restoring it to primitive purity be rendered much less difficult. Our packers already have their agents, not only in the Eastern cities of the United States, but also at Liverpool, Paris, Amsterdam and Hamburgh. The hungry world is reaching out to us for supplies of food. Enterprising men must comprehend the situation and make enlightened preparation for the time to come. Milwaukee is the greatest primary wheat market in the world. Chicago alone will be able to contest with us the ascendancy in cured meats.

INSPECTION.

It is impossible, with any reasonable outlay, to inspect all meat sold in more than two hundred places scattered over sixteen square miles in our city. Besides, the inspection of animals before they are slaughtered is even more necessary than the inspection of meat. If all slaughtering were done at an abattoir, one experienced and skilled man could inspect an immense amount of stock when ready to be killed. Diseased, maimed, feverish, or over wearied animals could be sorted from the healthy. Doubtful animals could be marked and the vital organs of such might be examined after slaughtering, in order to determine their fitness for human food. The good butchers would rejoice in such a course by the public authority, for they have no inclination to supply the people with unwholesome meat. Those who thrive by swindling the ignorant and the poor, at any cost to the health or even life of their victims, would find their occupation gone and turn their attention to some less guarded field of industry. The whole community would be protected against the purchase of unsound food. When it is remembered that the foul tape-worm comes from eating "measly" pork, that the deadly trichina comes to the human stomach from the flesh of swine, that sheep and cattle are liable to chronic or acute diseases which render their flesh unwholesome or dangerous to man, that unprincipled butchers slaughter animals too young or too lean for food, it will be acknowleged that intelligent and conscientious inspection is a great safeguard to the public. Professor Gamgee, speaking of the maladies of cattle, says: "Many of the worst forms of disease are very sudden, and only slightly affect the color and texture of the muscular apparatus. A fine, fat bullock, with florid meat, may have died from splenic apoplexy, or been merely killed *pro forma*, when already on the point of death. Remove the spleen, and the carcass appears sound. Yet dogs and pigs in this country die from eating, although first cooked, any portion of such cattle." It is known that a poison is very rapidly generated throughout the entire system of a severely bruised animal, yet such are slaughtered for the market and sold to the sausage-maker, if not to the dispenser of fat beef. Half dead animals mysteriously disappear from the stock-yards and nobody seems to know where they go. If the meat supply of a city were confined to an abattoir, where all stock must be inspected before slaughtering, these dangers would be removed.

STOCK-YARDS.

These should be located in connection with the abattoir and the packing-houses. Thither all animals brought to the Milwaukee market should be directly taken. I am very happy to state that the officers of the Chicago, Milwaukee and St. Paul Railroad Company have offered to remove their stock-yards to such a locality, to enlarge them as much as necessary, and to construct as many miles of track as may be required, "if the Menomonee Valley can be cleaned up," to use the terse language of Mr. Merrill, the General Manager. It would perhaps be better, if all interests could be united in union stock-yards, similar to those in Chicago.

"These fine yards," says Mr. J. C. Hoadley, of Lawrence,* "are owned by a company incorporated under the laws of Illinois, by special charter, in 1864, with a capital of $1,000,000, of which amount $925,000 was subscribed by nine railway companies. They were commenced in June, 1865, and opened for business in December of the same year. Their territory comprises three hundred and forty-five acres, of which more than one hundred and twenty are now occupied by pens, and the streets and lanes communicating with them; forty-seven acres are set aside for the hotel and other buildings, and one hundred and seventy-six are reserved for new pens. Twenty-one miles of railway connect the yards with all the important railroads centering in Chicago, and by skirting three sides of the space covered by pens far enough from their borders to afford double frontage, furnish great facilities for receiving and shipping animals of every description usually transported by rail. Two artesian wells * * furnish an abundant supply of excellent water, always flowing into capacious and accessible troughs, to which all animals within the yards have free access. Thirty-five miles of drains carry off the surface water; ten miles of streets give access, by means of over three thousand gates, to over two thousand open pens for cattle, one thousand covered pens for hogs and sheep, and to stables containing stalls for three hundred and fifty horses. The yards have capacity for twenty-seven thousand head of cattle, one hundred thousand hogs, and fifty thousand sheep. A large hotel, the 'Transit House,' fully up to the requirements of its public, * * * ; a fine range of buildings for the officers of the company and of persons engaged in the trade; a national bank, affording all needful facilities for transacting the large financial business of the market; and a newspaper, 'The Drover's Journal,' constitute, altogether, a very complete equipment."

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*Sixth Annual Report of the State Board of Health of Massachusetts, p. 121.

Stock-yards of equal extent are not required at present in Milwaukee. Yet grounds, quite as ample, should be secured from the beginning. Much of the stock that now passes through the city might be retained here, if we had proper facilities for taking care of it. More hogs come to this market than our packers can handle. Cattle designed to furnish beef for our tables should have ample space for healthful rest before being slaughtered. All the minor stock-yards now in the city should be done away with, and would not be required, if more than 200 little butchering places were closed. At least a mile square, on the lake shore, beyond Bay View, ought to be appropriated for stock-yards, an abattoir, and packing-houses. The general result would be, vast expansion of an important industry, enhanced value of real estate, inceased demand for labor, removal from the city of a great nuisance, and improvement to the public health.

CRUELTY TO ANIMALS.

By thus concentrating the slaughtering business, subject to expert inspection, a great deal of cruelty to the dumb creatures on which we feed might be prevented. There is no doubt that driving cattle, and especially swine, sorely tries the temper. But the seeming perversity of an excited, wearied, bewildered animal, on its unknown death-march to sepulture in the human stomach, is no excuse for brutality in man. I have seen creatures, that walk on two legs and wear clothes, stabbing cattle and swine with a pike, inflicting wounds never to be healed. The pole, in the end of which the pike is fixed, sometimes equals in length and size the handle of a pitch-fork. The pike end of it is protected from splitting by a heavy ferule of iron or brass. The drivers not unfrequently stab and maul the poor creatures with this formidable instrument of savage warfare, till they are bruised and pierced into a condition unfit for slaughter. They ply the ponderous weapon, as Mr. Hoadley says, "with the prowess and zest of *picadores.*" "Such wounds are as useless as they are cruel. The immediate pain, or apprehension of pain, which is all that it is useful to inflict, is scarcely greater than from a touch which makes no puncture and leaves no wound, since the nerves are far less numerous in the muscles than in the skin. But the deep puncture leaves a wound which is incurable in the low condition and excited nervous state of these animals during the few days of life remaining to them; and the result is a running sore or ulcer, which is revolting to contemplate."*

It is doubtless necessary that the goad should be used. Nothing else will govern an excited or refractory animal. But the brad should not be more than one-fourth of an inch long, and need not be thicker than a large needle. The animal dreads the light prick of such an instrument, among the thickly distributed nerves in the skin just beneath the epidermis, more than the benumbing stab that penetrates the celular tissue and the muscles. And the handle of the goad should be so light that the swine which has the impudence to walk on his hind legs and wear breeches, cannot brain with it his more humane brother that walks, less pretentiously, on all fours.

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*Ibid, p. 104.

If stock-yards were placed in proximity to an abattoir, under the supervision of an official inspector, much of this unnecessary cruelty might be prevented. It would require a small army of inspectors to follow the animals, when distributed, as they now are, to more than two hundred slaughtering places.

The percentage of mortality resulting from the transportation of animals has remarkably increased during the last decade. The act of Congress, of March 3, 1873, "to prevent cruelty to animals while in transit, by railroad or other means of transportation, within the United States," has failed, in part, to secure the end for which it was passed The President of the United States, in his last annual message, directed the attention of Congress to the subject anew. The first section of the Act provides, "That no railroad company within the United States, whose road forms any part of a line of road over which cattle, sheep, swine or other animals, shall be conveyed from one state to another, or the owners or masters of steam, sailing or other vessels carrying or transporting cattle, sheep, swine or other animals, from one state to another, shall confine the same in cars, boats or vessels of any description, for a longer period than twenty-eight consecutive hours, without unloading the same for rest, water and feeding, for a period of at least five consecutive hours, unless prevented from so unloading by storm, or other accidental causes." The penalty for disdisobeying the statute is not less than one hundred nor more than five hundred dollars. An exception is made, "when animals shall be carried in cars, boats or other vessels in which they can and do have proper food, water, space and opportunity for rest."

It has been found from experience that vigilant inspection is necessary in order to incline the hearts of sanitary sinners to obey this law. If the plan proposed were carried out, such inspection might be secured at this important point.

Cattle sometimes reach this city, as they reach other large cities, driven from a long distance. On the journey, perhaps they have had no food, save such as they could crop by the dusty roadside as they go. "They arrive," again to use the language of Mr. Hoadley, "wearied, foot-sore and fevered, with the last ounce of vitality sucked out of their juiceless fibres, and are fit only to avenge upon society, through such of its members as have been guilty only of apathy,—but, being guilty of that, guilty of all,—the cruel hardships to which they have been subjected."*

If all slaughtering were done at one place, the owners of such animals could be compelled to give them needed rest after their death-march, before transforming them with the knife into human food. And if the compulsory delay were proportioned to the exhausted condition of animals, it would ensure them better treatment on the journey, whether they traveled by rail or on foot.

The very method of slaughtering is sometimes simply murderous. I am told that in the great packing establishments, hogs have been lowered into scalding water before ceasing to squeal after being stuck. The Health Department of this city has had occasion to investigate a charge of pounding beef cattle on the head with a sledge hammer, in such a clumsy manner that several blows were required before the poor animals were rendered insensible. We owe it to dumb creatures that are helpless and unable to plead for themselves, to kill them as painlessly as possible, when we slaughter them for food. The English pole-axe is a much better instrument of death than a sledge hammer. In France and Germany, the *Bouterolle a la masque*, *Schlachtmaske*, *slaughtering-mask*, has been invented and humanely used. It consists of a hood, which is thrown over the animal's face, provided with a circular iron plate that rests upon the forehead between the eyes; in the center of the plate is a steel punch, which can be driven into the brain by a single smart blow with a hammer. If necessary, an iron rod may then be used to break up the base of the brain by thrusting it into the perforation. A German newspaper sums up the advantages of the mask as follows; "*First.* The duration of suffering is reduced to almost nothing. *Second.* The flesh and internal organs are in better condition. *Third.* The brain is natural in appearance, not congested. *Fourth.* Less strength and less exposure to danger of being injured are necessary on the part of the butchers."*

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*Ibid. p. 106.

If all slaughtering for the city were done in a suitable abattoir, with proper appliances, and under the eye of an inspector, the brutalities that are now complained of would become unknown. There are human beings who even take pleasure in the dying agonies of animals. It is said that the boy Pomeroy, the youthful Boston murderer, received his education in this direction before he was born. Cruelty to the brute creation reacts and produces its harvest of inhumanity and violence to society. The youth who grows merry over his awkward and ineffectual blows at the head of a bullock with a sledge-hammer, is educating himself to brutal entreatment of his fellow men. And nature swiftly breeds poison in every fibre of the terrified, enraged, and abused beast, wherewith to punish a community of beef-eaters for their ignorant or criminal indifference.

But the practical question arises, how shall the desired result be secured? A great majority of the butchers in the city are anxious that a proper abattoir shall be built. All interests point in that direction. It is a consummation devoutly to be wished by the whole public of Milwaukee. There seems to be no one with sufficient knowledge of the subject, with sufficient energy, with the comprehensive ability, to execute the plan. In order to prepare the way, to lay the foundation, there will be submitted to the Legislature this winter the following

BILL,

To provide for the regulation of the slaughtering of animals for food, the rendering of lard and tallow, the manufacture of the products of slaughtered animals, and the yarding of stock, in and around the city of Milwaukee.

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*See Dr. Folsom's article in the sixth annual report of the State Board of Health of Massachusetts, p. 181, where he gives a wood-cut of the instrument.

The people of the State of Wisconsin, represented in Senate and Assembly, do enact as follows :

SECTION 1. The jurisdiction of the city government of the city of Milwaukee, for all the purposes of this act, and for the purposes of enforcing the same and any ordinance of said city lawfully made in pursuance of this act, is hereby extended to all lands lying outside of the limits of said city for general purposes and not more than four miles distant from said limits.

SEC. 2. It shall be lawful for the Common Council of said city to provide by ordinance for the licensing and regulation of establishments for slaughtering animals for food, for melting or rendering lard and tallow, for manufacturing any product of slaughtered animals, and for yarding stock, such establishments to be called licensed abattoirs and stock-yards, and to be located outside of the limits of said city for general purposes and not more than four miles distant from said limits.

SEC. 3. Such ordinance or ordinances may fix the pay to be paid for such licenses, the time during which such licenses shall be operative, the conditions upon which such licenses shall be granted and the offences for which they shall be forfeited, and may provide rules and regulations for the management of such abattoirs and stock-yards, and may prescribe penalties for the violation of such rules and regulations.

SEC. 4. The Municipal Court of the City and County of Milwaukee shall have jurisdiction of all offences committed against the provisions of this act or any ordinance passed in pursuance thereof.

SEC. 5. From and after the establishment and licensing of one or more abattoirs and stock-yards under the provisions of this act it shall not be lawful for any person or corporation to slaughter animals for food, or render or melt lard or tallow, or manufacture any of the products of slaughtered animals or yard stock in the city of Milwaukee, or within four miles from the limits of said city, except in the cases and to the extent that the Common Council shall by ordinance expressly authorize; and every person or corporation offending against the provisions of this section shall upon conviction thereof forfeit to the city of Milwaukee a penalty of not less than one hundred and not more than one thousand dollars for each such offence.

SEC. 6. This act shall take effect from and after its passage and publication, and all acts and parts of acts conflicting with the provisions of this act in so far as they contravene the same, are hereby repealed.

There is no doubt that the city of Milwaukee has power to restrict slaughtering to designated localities or to drive it beyond the limits. There is already a decision of the Supreme Court of the State confirming this power. But additional legislation is necessary to enable the municipal government to exercise control over the business of slaughtering in a region beyond the limits of the city. When the requisite legislation shall be obtained, the Common Council of Milwaukee can adopt such measures as citizens may demand. One or more abattoir and stock-yard companies may be formed under the general laws of the state, and the same end may be indirectly reached that othcr cities have secured by charters establishing corporations, in states where special legislation is not prohibited by constitution.

"Only three years ago," says Dr. Bowditch, in his Centennial Discourse, "Brighton was a pestilent and disgusting place, owing to the number of slaughter-houses in it. In no direction, for miles in extent, could one drive without encountering the most sickening of smells. About fifty slaughter-houses were dotted in every direction over the place. No one except a butcher or his family, or one wholly regardless of comfort, could think of purchasing ground for a homestead on any one of its numerous and beautiful hills, because all were reeking with the putrefying blood and offal of slaughtered animals." "Last year the last Butcher in Brighton was compelled to give up his local slaughter-house, and to go to work in the newly built and admirably conducted abattoir. Land, only a few years since disgusting and repulsive to all visitors, has become fit for decent human habitations. The price of it has augmented, in certain places, threefold beyond what it was." pp. 49, 51.

SAUSAGE POISONING.

The Swabian method of preparing sausages, which has caused many cases of poisoning in Germany, is not unknown in this city. Professor Mueller sums up the faulty method as follows:

1. The meat used for the sausages is often insufficiently cooked.
2. A number of substances not suitable for sausages are employed in their manufacture, such as milk, flour, meal, brains, onions, roots of herbs, too large pieces of fat, etc.
3. The proportion of liquids to solids in the sausages is a wrong one.

Prof. Boehm, in Ziemssen's Cyclopœdia, vol. xvii, p. 540, says: "The peculiar method of smoking or curing the sausages practiced in Swabia also has disadvantages of its own. The smoking places are generally very badly ventilated, and instead of the sausages being hung high up in the chimney, where the smoke is thin and cool, as in other places, they are hung immediately over the fire, in the hot smoke. Moreover, in Swabia, they do not, as elsewhere, keep up a gentle or small fire all night, so that in winter it is quite possible for the sausages to freeze at night and be thawed again in the daytime, and this condition is just the very thing to favor the decomposition of the sausages. And lastly, it is said that in Swabia it is common enough for people to add bullock's blood, or the blood of sheep, or even of goats, several days old, to the sausages—and the latter are not kept in proper, cool, airy rooms, but in wooden boxes or chests. Blood-puddings and liver-sausages most commonly give rise to the poisoning cases, but they have been known to occur after the use of beef-sausages, pork-sausages, and other kinds. One kind, known in Swabia under the name of 'Blunzen,' consisting of pigs' stomachs filled with sausage-meat, seem to favor the production of the poison by their greater thickness, since it is easy to see that the perfect 'smoking' or 'curing' of so thick a mass can only take place slowly, and it is quite possible for the interior portions of the sausage to undergo a poison-generating process of putrefaction before they can be penetrated with the antiseptic constituents of the wood-smoke. All observers agree in considering the interior portions of the sausages as the most poisonous; some say the only poisonous part is the inside, and there are even cases on record of poisoning, in which only those who ate the tainted inner parts became ill."

There is evidence, perhaps not sufficient to convict in a criminal prosecution, that manufacturers of sausage sometimes use analine dyes to give a bright, lean-meat color to their products, and thus increase the market value. All kinds of material, sound and unsound, are worked up into sausage. The high seasoning disguises the unwholesomeness which would otherwise be apparent. The gradations from a good article, all the way down to the poisonous Swabian "Blunzen," are numerous, and the best antidote to the careless use of sausage would be a visit to some of the places where it is made. Under our present system of scattered slaughtering-places, there is no doubt that meat unfit for the poorest market finds its way thither. Tons of refuse meat reach Milwaukee from Kansas city, consigned to the sausage manufacturers, at a cost of two cents a pound.

TRICHINA.

"No animal," says Professor Van Beneden, of Louvain, "at any time has attracted so much attention as that little worm which lives in flesh, rolled up; it is about the size of a millet seed, and was found by chance in the dissecting-room of a London hospital, some forty years ago.† * * * The Trichina is a nematode worm, and not an insect, as it was at first called. Let us imagine an extremely slender pin, * * * rolled upon itself in a spiral form so as to lodge in a cavity hollowed out in the midst of the muscles, in a space not larger than a grain of millet. * * * Professor R. Owen * * gave them the name of *Trichina*, because they are thin as a hair; he added the

†It was in 1832.

specific name of spiralis on account of the manner in which they were rolled up in their cyst. *Trichina spiralis* is therefore the name of this animal

"The trichinæ, which are now completely known in the minutest details of organization and manner of life, have a distinct mouth, and they have a complete digestive tube with an orifice at each end of the body, like all worms in the form of a thread, which, for this reason, are called by naturalists *Nematodes* as opposed to *Cestodes* (in the form of a ribbon or tape). Besides this nutritive apparatus, trichinæ, like nematodes in general, have the sexes divided into two distinct individuals, so that there are males and females, which can be easily distinguished from each other by the form and size of the body.

"Trichinæ are found in the flesh of almost all the mamals. If we eat this trichinous flesh, the worms become free in the stomach as digestion goes on, and they are developed with extreme rapidity. Each female lays a prodigious number of eggs; from each of these comes a microscopic worm, which bores through the walls of the stomach or intestines, and thousands lodge themselves in the flesh, where they hide till they are again introduced into another stomach."

With this general 'description by Professor Van Beneden in mind, let us follow the migration of the little viper from the flesh of a pig into the flesh of man. A piece of raw or half cooked pork, containing encysted trichinæ, is eaten. In the stomach the cysts are digested enough to set the worms free. It would take twenty-eight of them placed end to end to measure an inch in length. It would take 600 of them laid side by side to measure an inch in width. After being set free they pass from the stomach into the intestines and uncoil themselves. Then they grow very rapidly and develop their sexual character. When grown it would take only from seven to nine of them placed end to end to measure an inch. A great number of eggs in the females are developed into embryos. Birth is given to a myriad of little trichinæ, so small that it would take from 120 to 140 of them placed end to end to measure an inch. The enterprising little rascals bore their way through the intestines and travel to every part of the body. The tissues are irritated by the journeying of the animals which tunnel as they go. Besides, they grow rapidly. And when they have selected and pre-empted a homestead they coil themselves up and each one separately builds about itself a house or cyst. They have now reached the same size the parents had when they first entered the human stomach. Here they wait, years it may be, foi some other animal to devour the flesh in which they are buried, when they, too, may be set free and enjoy a brief honey-moon, like their progenitors.

The disease caused by the migration of the little trichinæ from the intestines to the muscular parts of the body, and by their growth, is dreadful, and very often fatal. It resembles typhoid fever, with swelling and intense pain of the muscles. Death usually takes place in the fourth week. The worms have then done traveling, are developed and encysted. If the patients survive that period, they may live on for years, but they are pretty densely populated with worms. In a pound of human flesh, Leuckart found 700,000 trichinæ. In a cubic inch, 80,000 have been counted. It has been estimated that as many as 250 millions may exist in a single pig.

Trichinæ are very tenacious of life. Death of the animal which they inhabit does not destroy them. Complete decomposition of meat filled with them does not extinguish the vital spark of their existence. Freezing does them no harm. According to Kuechenmeister, ordinary smoking of meat does not disturb trichinæ. The corpse of a pig infected with them may be entombed in a pork-barrel, with plenty of salt, and the worms will survive. The carcass of an animal peopled with trichinæ may be "imprisoned in thick-ribed ice," may "lie in cold obstruction, and rot," without disturbing its encysted denizens. There is something sublime, even poetic, in the long, dumb expectancy of these little creatures, in their solitary and silent hope of a resurrection in the blood-warm stomach of some unknown animal, there to realize the Mohamedan glories of a new and fruitful life.

The only convenient thing that will kill them is an orthodox dose of fire. Man usually receives trichinæ from pork. According to Fiedler, a temperature of 155° Fahr., will destroy free trichinæ, but the encapsuled trichinæ require greater heat. I should advise giving them a wholesome Calvinistic climate of about 300°. Nothing but the thorough cooking of pork can make it safe food for man. If it cuts red and rare, like beef, on the table, it should be avoided with religious determination.

There have been grave epidemics of trichinosis in Germany and the United States. The disease has probably been more frequent than hitherto observed. Swine fed on garbage and offal are much more likely to be infected than those fed on the wholesome products of farms.

A DOUBLE NUISANCE ABATED.

Last year, almost every newspaper in the State contained complaints about an extensive manufactory of fertilizers at Brookfield Junction, several miles west of the city, in Waukesha County. Two lines of railroad cross each other at that point. The passengers on the cars justly complained of the intolerable smell from the "stink factory" there. The proprietor obtained his material from the packing-house of Messrs. Plankinton & Armor, in this city. The blood and offal, from the slaughtering of more than three thousand hogs daily, were loaded into cars standing on a side track for transporation to Brookfield Junction. The cars frequently stood on the track several days, till a sufficient number could be filled to make up a train. When the weather was warm, putrefaction took place before the train was moved. And the material leaked through the cars and was spilled in loading, until half a mile of the road bed was saturated with it. From the polluted ground and the putrid contents of the cars a very offensive and unwholesome smell was carried by the winds to many habitations on both sides of the Menomonee Valley. The nuisance was, therefore, double; afflicting both the denizens of Milwaukee and travelers by railroad through Brookfield Junction.

In order to reach the whole nuisance with a single blow, I served upon the General Manager of the Chicago, Milwaukee and St. Paul Railroad Company the following

ORDER.

"Information having reached this department that the Chicago, Milwaukee and St. Paul Railroad Company has allowed cars loaded with refuse animal matter, emitting a disgusting and unwholesome odor, to stand on side-tracks in the city of Milwaukee to the injury and discomfort of the inhabitants thereof; now, it is hereby ordered that said company desist from such injurious practice, and that said company hereafter when in the course of its business as a common carrier it has such material to transport through the city of Milwaukee the transit shall be made by night without delay. In this matter the jurisdiction of the Health Department extends to the boundary line of Milwaukee County."

The Company obeyed the order without delay, and no more material was transported from the packing-house to Brookfield Junction. The proprietor of the famous, or rather infamous, "stink factory," besought the Commissioner of Health, to make concessions, but was respectfully informed that the only concession he could obtain would be a visitation from the grand jury if he continued his offensive business. Thus was abated a nuisance that made up in magnitude for what it lacked in longevity.

Since then, Messrs. Plankinton & Armor have erected a new building, adjoining their packing-house, in which, by the use of excellent machinery, they transform blood and offal into fertilizers without creating odors offensive to the neighborhood. In this drying establishment, the contrivance for condensing aqueous vapor and burning the gases is superior to anything of the kind in operation here. The only lack in it is that sufficient air is not mixed with the gases before they are carried to the fire under the boilers.

The blood and offal of the other packing-houses are carried away daily to a factory some distance beyond the city limits and remote from any highway of travel.

SUBJECTS BRIEFLY DISCUSSED.

YELLOW FEVER.—SCARLATINA.—DIPHTHERIA.—PHYSICIANS.—UNDERTAKERS.—CITY HOSPITAL.—HOUSE OF CORRECTION.—COUNTY BUILDINGS.— ICE. — NUISANCE COURT.— STREET-SWEEPINGS.—GARBAGE.—MIDWIVES.— PRIVY-VAULTS.—ADULTERATIONS OF FOOD AND DRINK.—THE METRIC SYSTEM.—NOMENCLATURE OF THE CAUSES OF DEATH.—DETAILED FINANCIAL STATEMENT.

"Sanitation must be attended to chiefly when no disease is present or even threatening."—PUBLIC HEALTH ASSOCIATION.

I. YELLOW FEVER.

During the prevalence of the wide spread epidemic of yellow fever in the South, the past season, the people of Milwaukee were considerably excited on account of the arrival of fugitives from the afflicted region. This brief chapter is written, not for the purpose of attempting to make any contribution to the literature or science of the disease, but for the purpose of explaining its possible relations to the people under my own sanitary charge.

The vast literature of the subject is in a state of great confusion and perplexing contradiction, owing, in my judgment, to the confounding of certain icterode forms of malarial fever with true yellow fever. The word fever is unfortunate, here as well as elsewhere, in as much as it expresses a morbid condition of many diseases, instead of a disease itself. The icterode forms of malarial fever are climatic, not contagious, and are influenced by specific treatment. True yellow fever is not the product of climate, although dependent on climate for the conditions of its growth, prevalence and intensity; is contagious; and is not even modified by any known treatment.

In a few sentences I will give the conclusions of some eminent physicians who have had experience with yellow fever, but would suggest that readers do not loose sight of the distinction made in the previous paragraph.

Here in Wisconsin, we are not in the yellow fever belt of the world. It is rarely found south of the twentieth degree of latitude, or north of the fortieth degree, at this end of the globe. It is much more common in the Western Hemisphere than in the Eastern. It is more common in Europe than in Africa. It is almost always confined to commercial sea ports, and to towns on the banks of navigable rivers. In sections of the country where it prevails, it is usually confined within circumscribed limits. In the Eastern Hemisphere, it visits most frequently the Mediterranean ports of Spain. In America, the sea ports of the Gulf of Mexico are its favorite seats. It frequents the Atlantic ports from Charleston south, yet it has often visited ports as far north as New York. New Orleans is a favorite haunt of yellow fever, and it often visits Natchez, Vicksburg, Memphis and other river towns on the lower Mississippi. Probably the *habitat*, or native place, of yellow fever is on ship-board. There it usually breaks out while the ship is in port. Sometimes it breaks out in a ship at sea. In 1799, the frigate Gen. Green sailed from Newport, Rhode Island, for Havana, and yellow fever broke out before she reached port. Dr. La Roche, who has written the most exhaustive treatise on the subject, shows, as I think conclusively, that the origin of yellow fever is on shipboard, without the operation of external agencies; but he probably goes too far in saying, without "the introduction of contagious germs." Dr. Wilson, a very high authority, says that, at the beginning, the disease is confined to a small space on shipboard, usually the centre, where the bilge-water settles. It is a curious thing often observed, that yellow fever is usually confined to certain well defined quarters or neighborhoods, in cities where it prevails. Dr. Nott, of Mobile, says: "I have on two occasions seen yellow fever commence in a point in the town, and eat through it, square by square, like worms in a cotton field, taking each time nearly a month for the process." M. Berthe, one of the French commission to investigate the epidemic at Andalusia in 1800, says: "It was distinctly observed that the malady seized all the houses situated on the same side of a street, and rarely passed over to the other side, where streets were wide and well aired."

The disease is almost always most prevalent in July and August, but sometimes extends through September, October, and even November. In 1793, a severe epidemic visited Philadelphia, which lasted till the middle of October. A great epidemic visited New York in 1798, which lasted till the middle of November. The deaths were over two thousand. In New York, between six and seven hundred died with yellow fever in 1803. Three hundred died with it there in 1805. In the same city there were one hundred and sixty-six deaths in 1822. It is a curious fact that in New York, in 1800, it continued ten days or more after the first frost. But, as Dr. Walters says, the out-door poison was killed by the frost, but the infection remained in the houses. Dr. La Roche gives an analysis of fifteen epidemics in which the mortality was greatest in October. In Philadelphia, in 1820, it lingered till the last of November. As they say in the South, it requires a black frost to kill it. The most reliable observers of yellow fever have come to the conclusion that its prevalence does not depend upon the heat of the season. The New Orleans Board of Health say: "The disease has been known to prevail here alike in dry or wet seasons, and without regard to the variations of temperature in the summer months."

There are many curious facts in regard to the disease. As a rule, people will not have it twice. Men are more susceptible of the disease than women. In an epidemic which desolated the island of Barbadoes, for one woman that died there were ten men. In the great Spanish epidemic of 1804, the aggregate mortality in twenty-three towns was 45,322; the male deaths amounting to 28,852, the females to 17,470. In Charleston, South Carolina, from 1817 to 1839, there were 976 deaths of males, and 178 of females. As a rule, negroes have yellow fever much more lightly than Caucasians. Yellow fever is more liable to attack plethoric and stout people than the delicate and feeble. Several first-class authorities have observed that persons suffering with syphalitic disease are especially liable to it. In yellow fever regions the natives are much more exempt than the unacclimated.

Dr. Greeneville Dowell, in his treatise on yellow fever and malarial diseases, expresses the views of many, when he says: "Yellow fever cannot be taken, in pure air, from persons, clothing, trunks, or black vomit; but in an impure air, other things being suitable, it can be taken from either." From his investigation into the conditions and causes of yellow fever in the United States, with the help of the library of the surgeon-general at Washington, and a personal experience of over two thousand cases, he concludes that nothing is so important in the prevention of yellow fever as proper water supply and sewerage. More than one-tenth of the inhabitants of Buenos Ayres died of yellow fever in 1871. As the epidemic was traced largely to filth, an English engineer was employed to carry out a complete system of sewerage and water supply. A recent sanitary report emanating from that city says: "The works of drainage and sewerage so actively prosecuted at the present time are destined to radically remove this infection, which experience has demonstrated to be one of the most fruitful causes of disease and death." While the federal troops were in possession of New Orleans, during the late "unpleasantness," the commanding general required the city to be cleaned up, the result of which was the banishment of yellow fever for the time being. Not that Gen. Butler and the medical men on his staff knew more about yellow fever and sanitary science than the existing board of health of New Orleans; but under martial law, with a great army at command, certain things can be easily done which municipal governments utterly fail to carry into effect. Fools in every community resist, actively or passively, the execution of sanitary law, and nothing less stringent than military despotism can overcome the resistance.

"*Resolved*, that in the absence of any evidence establishing the conclusion that yellow fever has ever been conveyed by one person to another, it is the opinion of this convention that the personal quarantine of cases of yellow fever may be safely abolished, provided that *fomites* of every kind be rigidly restricted." This resolution was adopted by the National Quarantine and Sanitary Convention,* held in the city of New York in 1859. It embodied the views then held by a great majority of the medical fraternity in this country. Only one medical man in the convention voted against the resolution. The word *fomites* however, should be carefully considered.

*The first of these Conventions was held at Philadelphia, in 1857. The second was held at Baltimore, in 1858. The third was held at New York, 1859. The resolution in the text is quoted from the proceedings for that year. The final meeting of the Convention was at Boston, in 1860. The breaking out of the great war, soon after, swallowed up all minor interests. The subject was revived in 1872, when the American Public Health Asssociation was organized, which has held an annual meeting every year since.

It means the presence in merchandise, clothing, etc., of miasms other than those generated in the body. It was the conclusion of that convention that yellow fever comes from such a source.

In striking contrast with the resolution of 1859, were the conclusions reached by the Yellow Fever Commission in a report presented to the American Public Health Association, at Richmond, on the 20th of November, 1878, after investigating the sad but instructive epidemic of last season:

"1. We have not in a solitary instance found a case of yellow fever which we could justifiably consider as of *de novo* origin, indigenous to the locality.

"2. In respect to most of the various towns which we visited and which were points of epidemic prevalence, the testimony showing the importation was direct and convincing in its character.

"3. The transmission of yellow fever between points separated by any considerable distances, appeared to be wholly due to human intercourse. In some instances the poison was carried in clothing, or about people going in infected districts. In others it was conveyed in cotton bagging, or other goods of the same description.

"4. The weight of testimony is very pronounced against further use of disinfectants. Physicians in infected towns, almost without exception, state that they are useless agents to arrest the spread of yellow fever, while some of them affirm that their vapors are seriously prejudicial to the sick.*

"5. Personal prophylaxis by means of drugs or other therapeutic means, has proved a constant failure. A respectable number of physicians think the use of small doses of quinine of some use in the prevention.

"6. The quarantines established with such a degree of surveillance and rigor that absolute non-intercourse is the result, have effectually and without exception protected its subjects from yellow fever."

I have no doubt that the source of the disease, the real contagium, is a microscopic organism which flourishes about shipping in the ports of hot climates, but will not germinate in this region. To borrow an idea, and in part the words, of Dr. Wm. Roberts, in his address before the British Medical Association, 1877, the yellow fever virus may be an occasional "sport" of some West Indian saprophyte, which by variation has acquired a parasitic habit, and having run through countless generations either dies out or reverts again to its original type. When the variation occurs, yellow fever becomes epidemic. When it dies out, or reverts to its original type, yellow fever disappears. If this organism were brought here, by merchandise or persons, from an infected region of the South, it would perish, like any other tropical plant, when exposed to our air. But, whatever theory of the disease may be adopted, the people of Milwaukee are in no danger of yellow fever.

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*The Association did not endorse this conclusion of the Commission.—Ramon da Luna used fumigations of nitrous acid, and European authorities assert that no other agent is so effective in preventing the spread of the disease.—Ann. d'Hygiene, April 1861.

There is evidence that clean towns, even in the South, were exempt from the epidemic last summer. The Charleston, S. C., delegates to the Public Health Association, in a report to the Board of Health of their own city, after their return from Richmond, make the following very important statement: "That there were local sanitary conditions or climatic influences, which in certain instances afforded immunity from an epidemic, was made apparent, not by the Commission, but from facts presented by individual members of the profession who were present representing towns located in the midst of the infected region. The town of Huntsville, Alabama, containing 5,000 inhabitants, afforded a striking illustration of this fact. Its doors were opened to refugees from Memphis and other stricken cities, quarantine was entirely disregarded, the refugees entered with their trunks, bedding and other effects. Out of the number of refugees twenty-four sickened with the disease after their arrival. These were quartered in different portions of the town; no effort was made to isolate them, and yet not a single one of the people of Huntsville suffered in consequence. It was ascertained that this town had some years since suffered from epidemic cholera. At that time great energy had been manifested, the place was put in thorough sanitary condition, and has been so kept ever since. No other explanation can be offered of Huntville's escape from pestilence."

II. SCARLATINA.

When I took charge of the Health Department of Milwaukee, this dreaded disease was quite prevalent and many families were in mourning on account of its ravages. Vigorous means were taken to secure from attending physicians reports of all cases to this office. Large placards, printed in German, as well as English, were placed upon all houses where the disease was known to prevail. The regulation in regard to excluding from schools the children of families afflicted with scarlet fever, diphtheria, and small-pox, was inflexibly carried out. Undertakers were required, by general order, in cases of death by contagious disease, to put in the bottom of the coffin sawdust saturated with a solution of chloride of zinc, and not to open the coffin at the funeral under any circumstances. The Commissioner of Health also issued the following:

CIRCULAR.

It is not the wish of the Commissioner of Health to obtrude any special views in the treatment of a dangerous and highly contagious disease, or to supersede the directions of medical attendants. His sole aim is to secure sanitary regulations for the protection of the public.

There are indications of a coming severe epidemic of scarlet-fever. The "little ones" of a community are in most danger. All good citizens will co-operate with this department in efforts to prevent the spread of this disease. The regulations here following are condensed from a carefully prepared circular sent out by the State Board of Health of Massachusetts:

1. Scarlet-fever, scarlatina, scarlet-rash, canker-rash, and rash-fever are names of a contagious and infectious disease of varying degrees of severity, but in which all the forms are capable of conveying the most severe type. A person may become ill with fatal scarlet-fever from association with another who had so

mild an attack of the disease as not to keep him in the house, much less in bed.

2. It is generally agreed among sanitarians, that scarlet-fever is conveyed from one person to another by means of the epithelium or thin superficial covering which extends over the whole body, under the name of epidermis, cuticle, or scarf-skin, and which also lines the inner passages of the body. The exhalations from the outer and inner surfaces of the various parts of the body, and from the excretions also, are capable of transmitting the disease. Upon whatever the contagious matter depends for its dangerous character it is capable of retaining its power to carry the disease for a long time—certainly, many months, and possibly for a year or more—unless destroyed.

3. The means of transporting the contagium of scarlet-fever may be furnished by anything that has come in contact with an infected person or object,—air, food, clothing, sheets, blankets, whiskers, hair, furniture, toys, library-books, wall-paper, curtains, cats, dogs, etc. Funerals have occasionally spread the disease, the exhalations from the dead body being also dangerous.

4. The period from exposure which results in scarlet-fever, to the time when the symptoms manifest themselves, varies from several hours to three, and possibly four, weeks. The average time is variously given from six to eight or ten days.

5. The time at which one who has been ill with scarlet-fever may safely mingle with other people is not always easy to determine; but it is, for convenience, usually placed by sanitarians, at four weeks from the commencement of the illness, as that covers the vast majority of cases, and it is best to have some arbitrary rule.

6. The patient should be placed in a room as much separated from the rest of the house as possible, and communicate with no more members of the household than is absolutely necessary.

7. The sick room should be well-warmed and ventilated. It should be open to the sun, as free as possible from noise, dust, etc., and not "aired" by cold draughts, which are often more dangerous than a foul atmosphere.

8. All carpets, upholstered furniture, window hangings, and, indeed, unnecessary objects of every kind, especially woolen, should be removed from the room. Bits of carpet may be used and burned after the need for them has passed.

9. The discharges from the throat, nose and mouth of the patient may be put in a vessel containing a strong solution of some "disinfectant," which shall be frequently washed with hot water; they should not be received upon anything which is to be kept. Pieces of soft cloth, which should be at once burned, may be used in place of pocket-handkerchiefs. The breath should be kept as pure as may be, by cleansing gargles and washes for the mouth. The discharges from the kidneys and bowels should be disinfected with boiling water to which some deodorizer may be added. Carbolic acid may be added as a "disinfectant"

to the slops, and to the water in which the patient has washed, before throwing it out. The skin is usually more comfortable in feeling if cosmoline, etc., or sweet oil, with a couple of grains of camphor to the ounce, is used for annointing it; the scales of the cpidermis are also thereby prevented, to a considerable degree, from escaping freely into the air. The bed-clothes, towels, etc., when disused, should be removed with proper care, and be boiled for a couple of hours. The food left uneaten shonld never be carried where it may infect other persons.

10. Attendants on the sick should be as few as possible, and should not communicate with other persons any more than can be helped. They should wear only such clothing as may be readily washed. Clothes used in the sick room should be boiled before being worn elsewhere.

11. After recovery, the patient should not mingle with other persons, use lounges, carriages, public rooms, etc., liable to be used by others, until all roughness of the skin has disappeared, and until he has taken warm baths for several days.

12. After the sick room is no longer needed as such, all the clothing and other matters used in it should be soaked in boiling water. Any articles of trifling value may be destroyed by fire. The ceiling should be washed with soap and hot water, or scraped. The floor and wood-work should then be thoroughly washed with soap and hot water. Scraping and repainting would not be considered an excess of caution in time of epidemics.

13. Should the sick person die, the body ought not to be removed from the sick room until it has been sealed in the coffin, with carbolate of iron, carbolized earth, or some similar agent. It is advisable that the funeral should be as private as possible, and not attended by children.

14. Anything which deteriorates health tends to render the system liable to any disease; and in that sense filth may be considered to promote scarlet-fever or to increase its mortality. Perfect cleanliness should therefore be enjoined. Sewer-gas, of course, is a kind of filth which may bring to one person's chamber, if it has access thereto, the contagium brought from another chamber and not disinfected. Finally, fresh air is one of the best disinfectants.

15. To disinfect soiled clothing, discharges of patient, or exposed water closets, the New York Health Department recommends the following: Half pound of sulphate of zinc and one ounce of carbolic acid in three gallons of water. Soak the clothing one hour. For the zinc one pound of chloride of iron may be substituted.

16. To wash furniture, fixtures, etc., of infected rooms, use one pint of Labarraque's Disinfecting Fluid, (chlorinated soda) in five pints of water.

17. Any good citizen will cheerfully submit to the temporary inconvience of a warning card on his house, for he cannot wish by any chance to expose others to the same affliction that has fallen upon his own household.

The circular was issued in German, as well as English, for German is the mother-tongue of nearly, if not quite, one half the people of Milwaukee. A copy of it has been delivered by the sanitary inspector to every family whose dwelling is placarded on account of the disease. Nearly the whole press of the city published the circular as a matter of public interest.

Subsequently, after recovery or death, houses have been disinfected by a trained and careful expert with sulphurous acid vapor, according to the strictest rules for disinfection. Owing to all of these measures, and to the favor of Providence, who helps those who help themselves, especially in sanitary matters, this disease, perhaps the most difficult of all diseases to control, has been nearly extinguished in Milwaukee for the present.

III. DIPHTHERIA.

When the Commissioner of Health took charge of the Department at the close of April last, there was not a striking amount of diphtheria in the city. The disease was nearly in abeyance during the hot months of summer. Early in the autumn it showed itself with fresh vigor and soon threatened to become epidemic. The people manifested some alarm and the Health Department was expected to meet the advances of an insidious foe. Following the same course that had been productive of satisfactory results in scarlatina, the Commissioner of Health issued the following

CIRCULAR.

Whenever a card is placed upon a house, in accordance with the requirements of law, on account of the presence of diphtheria, a copy of this circular will be left with the family occupying it. The circular is not designed to supercede the work of educated physicians, but to aid them by giving sanitary information to citizens whose households are afflicted with a dreaded disease.

The brief description of the disease is condensed from Dr. Felix Von Niemeyer, Professor of Pathology and Director of the Medical Clinic of the University of Tubingen, one of the best and most authoritative medical writers in Germany. The sanitary rules to be followed in the management of diphtheria are taken in part from a circular issued by the State Board of Health of Massachusetts.

Diphtheria belongs among the infectious diseases, and even among those that are most typically *contagious*. The contagion is contained in the false membrane and shreds of tissue detached from the fauces, and in the air breathed out by the patient. Physicians are in great danger of being infected by the morbid products coughed out by the patient when they are painting or cauterizing the throat. Science has to mourn the loss of a series of excellent physicians and observers who have fallen victims to diphtheria while in the line of their duty. The numerous cases of infection of persons who have been in the same room with diphtheritic persons, without coming in their immediate vicinity, prove that the air exhaled by the patient, which does not contain shreds of exudation or tissue, is a vehicle for the contagion.

The disease almost always begins with apparently insignificant and harmless symptoms. In some cases the general health is distubed a few days before the disease breaks out; the appetite is less; the patient complains of dullness, depression and chilliness. More rarely, the disease begins with a severe chill accompanied by nausea and vomiting. At the same time the patient complains of difficulty of swallowing; but in most cases this is no greater than is usual in simple catarrh. If the fauces be not yet covered with false membrane, but only somewhat reddened and swollen, at this stage we can only suspect or recognize the disease when we know that diphtheria is epidemic, or that persons about the patient have or have had the disease. A very suspicious, and usually a very early symptom, is a hard swelling of the glands at the angle of the jaw in the neck. Not unfrequently the persons about the patient have their attention first called to the disease by swelling of these glands, the complaints of slight difficulty of swallowing having passed unnoticed. It is far more common for us to find more or less extensive grayish white patches in the fauces at our first examination, than to have the opportunity of examining the throat at the commencement of diphtheria, before the formation of false membranes has begun. And then we can have no doubt about the dangerous and malicious foe with which we have to deal. Even cases where the disease has begun without a chill, where the fever is slight, where the general health is excellent, so that the patient can hardly be kept in bed, we are not at all sure that the disease will run a favorable course.

If the disease has begun violently, its subsequent course is usually more severe. In many cases the putrefaction of the false membrane causes a penetrating, foul breath. If the nasal mucous membrane participate in the disease, a discolored, fetid fluid flows from the reddened and eroded nostrils. The swelling of the glands in the neck becomes more marked; the glands are hard, but have no tendency to suppurate. Even, after a few days, death may occur from general paralysis, while the intellect remains clear. Some patients, whose state had not excited any anxiety, and whose general condition was previously very satisfactory even, die unexpectedly with the symptoms of general collapse, without our being able to find any explanation for the occurrence.

The disease, as above described, is greatly modified when the diphtheritic inflammation of the fauces is accompanied by croupous inflammation of the larynx and trachea; for then the symptoms are complicated with hoarseness, loss of voice, great difficulty of breathing, and other symptoms of croup. This complication occurs in mild, as well as in severe cases.

Even when the disease apparently ends in recovery, it is often followed by paralysis. Diphtheritic paralyses come on from two to four weeks after the disease disappears. When the soft palate is paralyzed, the patients have a nasal voice; on attempting to swallow fluids, they enter the nose. This paralysis of the muscles near the seat of diphtheritic inflammation is most frequently accompanied by that of the muscles of the eye, and the patients begin to squint. The extremeties also, especially the feet, are occasionally attacked by more or less complete paralysis.

The physician should protect himself from contact with the false membrane and shreds of tissue that are coughed up, and should warn attendants on the patient of the danger of this contact. When circumstances permit, those who have nothing to do with the care of the patient should keep out of the sick-room.

Families afflicted with diphtheria and attending physicians should carefully observe the following rules:

1. As diphtheria is always contagious, sometimes highly so, all practical means should be taken to separate the sick from the well.

2. As diphtheria is infectious, woolen clothes, carpets, upholstered furniture, curtains, etc., should be avoided in the sick room, and only such materials used as can be readily washed.

3. All clothes, when removed from the person or bed of the patient, should be immediately placed in boiling water.

4. Pieces of soft linen or cotton cloth should be used, instead of pocket handkerchiefs, and at once burned.

5. Disinfectants should always be placed in the vessels containing the discharges from the throat, nose, kidneys and bowels. (Nitrate of lead and chloride of zinc are good.)

6. Pure air is the best of disinfectants, and should be supplied by free ventilation, but care must be taken not to expose patients to the cold.

7. Choose a room for the sick, that has no connection with the sewers, by water-closet or by wash-basin. The highest room in the house, other things being equal, is the best.

8. Make haste to report cases to the Health Department, that notice may be given to schools without delay.

9. In all cases of diphtheria, fully as great care should be taken in disinfecting the sick-room, after use, as in scarlet fever or small-pox.

10. After a death from diphtheria, the clothing disused should be burned or put in boiling water; the body should be placed as early as practicable in the coffin with disinfectants, and the coffin should be tightly closed.

11. Children at least, and better adults also in most cases, should not attend a funeral from a house in which a death from diphtheria has occurred. In no case must the corpse be exposed at the funeral.

12. Diphtheria, like yellow fever, typhoid fever, and several other diseases, rarely, if ever, becomes epidemic, except in the midst of filth, especially the filth of privies, cess-pools, foul sewers, earth sodden with buried excrement,

unclean cow-stables, putrid garbage, stinking hog-pens, stagnant water, etc. Let each good citizen co-operate with the Health Department in preventing the spread of contagious diseases and in removing from our fair city the causes of epidemics.

13. To disinfect soiled clothing, discharges of patient, or exposed water closets, the New York Health Department recommends the following: Half pound of sulphate of zinc and one ounce of carbolic acid in three gallons of water. Soak the clothing one hour. For the zinc one pound of chloride of iron may be substituted.

14. To wash furniture, fixtures, etc., of infected rooms, use one pint of Labarraque's Disinfecting Fluid, (chlorinated soda) in five pints of water.

16. Any good citizen will cheerfully submit to the temporary inconvenience of a warning card on his house, for he cannot wish by any chance to expose others to the same affliction that has fallen upon his own household.

The circular was issued in German, as well as English, for the reason already stated in another section. Both the English and German newspapers copied the circular, so that it reached a great majority of the households in the city. The people of Milwaukee in fact, owe a debt of gratitude to the press for distributing to them during the season a large amount of sanitary information. The most thorough system of disinfection was instituted, and physicians were required to report every case to the Health Department, without delay, in accordance with the requirements of the City Charter. The ordinance of the Common Council, requiring the Commissioner of Health to placard all houses in which there is contagious or infectious disease, has been carried out to the letter. Undertakers have commendably obeyed an order not to allow exposure at funerals. When a convent in the city thoughtlessly exposed a class of little girls, by allowing them to attend the funeral of a class-mate, who had died of diphtheria, as ornamental pall-bearers, the venerable and wise Catholic Archbishop, on the representation of the Commissioner of Health, interposed his Christian authority to prevent any recurrence of such an imprudence. Religion and science should thus ever walk hand in hand, for the good of mankind. Under such measures, tirelessly and patiently enforced, the disease was soon under control and rapidly abated. I firmly believe that, with neglect, diphtheria would have become very prevalent and unusually fatal in the city before the close of the year.

The following, cut from a newspaper, contains valuable instruction and cannot be too often repeated:

HOW DIPHTHERIA IS SPREAD.

"A few weeks ago, a little girl, in St. Alban's, Vt., who had just recovered from diphtheria, was taken by her parents to visit a family in a neighboring town. She slept with the children in the family, and shortly afterward, three or four of them were taken with the malady, and some have since died. The family permitted relatives and neighbors to visit them, and the result is several cases in the neighborhood. They have public funerals, even keeping the remains of one child an unusual time waiting for another to die, so as to bury them together; and this also spread the contagion. The physician was not over-well informed—and many physicians are not concerning the contagious character of disease; therefore, he did not take the necessary precautions for the protection of the neighborhood or of his own family, and the result is that one of his own children has died and another is dangerously ill. A lady who went to one of these houses to robe the victims for the graves has called at houses in the vicinity where there are children, without any change of her garments or any attempt at disinfection, and has fondled the children in those families, apparently in utter ignorance of the danger to which she was exposing them."

IV. PHYSICIANS.

"There is but one temple in the world," says Novalis, "and that is the body of man. Nothing is holier than this high form. Bending before men is a reverence done to this revelation in the flesh. We touch heaven when we lay our hand on a human body." Speaking of this temple not built with hands, the incomparable Watson says: "You cannot have looked into the mechanism of that intricate but perfect work—you cannot have contemplated its fullness of exquisite contrivance—its endless examples of means adapted to ends—its prospective expedients against future needs—its compensations for inevitable disadvantages—its direct provisions for happiness and enjoyment—without receiving the profoundest convictions of the being and attributes of its Maker. It is upon human anatomy that Paley, in his unrivalled argument for natural theology, 'takes his stand,' and sixteen centuries before him, Galen had felt that, in writing his anatomical treatises, he was composing a hymn to the Deity; that an exposition so indicative of the wisdom, the power and the goodness of God, was an act of piety and praise."

Such is the very foundation of the studies of educated medical men. Yet into the profession creep pretenders, for whose sins the good and the true have to suffer. The creature Burke, who murdered his fellow-men, for the purpose of selling their bodies to dissectors, has been sometimes regarded as the wickedest of mankind. Yet far below Burke is the human being calling himself a doctor, who connives at the spread of contagious disease for the sake of increasing his chance of practice. To the true physician, the public good is of infinitely more consequence than his private gain. No men do so much gratuitous work, work for which they expect no reward but a sense of duty performed, as those who in the real and highest sense of the term belong to the medical profession. . The sterling quality of the true coin makes the counterfeit seem more base.

In order to bring contagious and infectious diseases, within my jurisdiction, under the supervision and effective control of the Health Department, I found at the outset that it was necessary to make the practicing physicians of Milwaukee obey the law. It was not an easy task to address the profession as a whole properly. Some needed no admonition at all. Others only needed to be reminded in delicate proseology that the public interest would be promoted by prompt reports of all cases in their practice, of contagious disease. Others, whose hearts are in the right place, needed to have their indolence or heedlessness rather emphatically touched. Some required a pretty stern hint of the consequences following infraction of law. A few needed to be shaken over the pit of a criminal court. Some required to be brought face to face with the terror of being stripped of their pretence, of being exposed as unmitigated quacks. Mindful of the difficulty, and being under the necessity of addressing myself to all practicing physicians, I issued the following

CIRCULAR LETTER:

DEAR SIR:

The object of this communication is to especially remind you that there is a law requiring every physician in the city to report to this office, *within twenty-four hours*, any case of contagious or infectious disease, especially small-pox, scarlet fever or diphtheria, occurring in his practice, under penalty of a fine of not less than $25 nor more than $250. From the date hereof, the law will be rigidly and impartially enforced. Cards can be obtained at this office, containing printed forms for making such reports.

Every enlightened medical practitioner will appreciate the necessity of co-operating with the regular authorities in preventing the spread of contagious diseases. Every family has the right to know the houses where such diseases exist. It is the duty of this office to put warning signs on such houses without delay; but how can it be done if the attending physicians neglect or refuse to give the necessary information? Schools must be speedily warned, where unsuspecting innocent children are pursuing their studies; but how can this be done if the doctor criminally lends himself to concealment? It is a strangely inconsiderate selfishness that would endanger neighbors and the whole public, in order to avoid the comparatively trifling inconvenience and disagreeableness of having it announced in a card on the house that contagious disease exists within. With such selfishness no truly professional gentleman can ever sympathize. This office, sternly pursuing its duty to the public, in the teeth of thoughtlessness and sluggish indifference, to say nothing of ignorance and prejudice, has a right to expect your conformity to law, if not your encouragement and aid.

A single illustration. During the past few weeks this office has had to manage the sanitary surroundings of a household in which nine members have been ill at the same time with small-pox. An older brother, employed as teamster, unwittingly entered a house where the disease was concealed, caught it and gave it to nine younger children. This calamity befell a poor German laborer, because the selfishness of somebody else led to criminal avoidance of a card on the house, probably with the interested connivance of a "doctor," who needs reminding that "Medicine is the noblest of all professions and the meanest of all trades." The German laborer wished to have his house placarded, for he was unwilling to run any risk of inflicting upon others a misfortnne visited upon his own home. His family are all well again and he rejoices to know that the disease has not spread to his neighbors.

The good and the true of the profession will co-operate to prevent disease, instead of lending themselves passively to its increase.

From one point of view, this communication seems too harsh. From another point of view it seems too mild. It was at least a warning, and when it subsequently become necessary to prosecute one or two delinquents they could not plead ignorance of the law and the requirements of the Health Office. If the consequences were severe in one or two cases, the transgressors had only themselves to blame. It was not pleasant to the Commissioner of Health to punish even those who defied his authority, but he was bound to fulfill his duty. A minimum of criminal prosecution and a few sharp rebukes have been sufficient to protect the public. In this matter, also, the Health Department has been sustained by the courts, the press and the people; and, I am happy to add, by more than nine-tenths of the profession. In all efforts to check or exterminate contagious disease in a community, faithful and intelligent co-operation of physicians is a primary need.

V. UNDERTAKERS.

Soon after I took charge of the Health Department, I found that many prudent citizens were complaining of the carelessness of undertakers, who were in the habit of opening coffins at funerals, yielding to the solicitation of friends of the deceased, even when contagious disease was the cause of death. In some cases, after death by small-pox, the coffin had been taken to a church, where the mourners and the curious were allowed to take a last look at the face of the dead. At scarlatina and diphtheria funerals, very few precautions were observed. The undertakers were aware of the dangers of such exposure and were ready to co-operate with the Department in applying a remedy, if indeed a remedy could be found. They declared their inability to resist the wishes of the people whom they served. They also expressed their opinion that any attempt to prevent the practice would fail, because it would encounter an irresistible amount of religious prejudice. The Commissioner came to the conclusion that a great majority of the people would sustain him, if he aimed a decisive blow at the very root of the evil and made an honest effort to remove the danger. Consequently to all undertakers in the city was issued the following

ORDER:

In cases of death by contagious disease, undertakers will put in the bottom of the coffin (which should be water-tight) from four to six inches of sawdust saturated with a solution of Chloride of Zinc (Burnett's Disinfecting Fluid,) and not open the coffin at the funeral under any circumstances.

By order of the Commissioner of Health.

A committee of undertakers waited on me, petitioning for a modification of the order, so as to allow them to use their own disinfectants, and to open the coffin when required by the officiating clergyman. I was relentless on both points. Most of them were in the habit of using aromatics, instead of disinfectants, which concealed unpleasant odors, but did not destroy contagion. A few people grumbled about tyranny in a free country, and one clergyman sent me word that I was interfering with Divine Providence. I sent him back word that if he would produce an authenticated order from Divine Providence that small-pox, scarlet fever and diphtheria, shall not be contagious at funerals, then the Commissioner of Health would consider his order superceded. Public opinion, in an enlightened city, sustained me, and the practice of a few ceased at once to endanger the many.

Some months afterwards, in order to prepare the way for a more strict enforcement of existing regulations, I issued the following

CIRCULAR:

To Undertakers, and Officers having charge of Cemeteries:

Your attention is hereby directed to Chapter III, of the General Ordinances of the City of Milwaukee, concerning the Burial of the Dead. As amended by the Legislative Act creating the office of Commissioner of Health, it reads as follows:

"SECTION 1. Upon the death of any person within the corporate limits of the city of Milwaukee, it shall be the duty of every undertaker or other person who inters such deceased person, and before the removal of such deceased person or interment, and within thirty-six hours after the death of such person, to apply to the Commissioner of Health of said city, or to the Clerk of the Commissioner of Health, and obtain a permit for interment from said Commissioner of Health, or Clerk of the Commissioner of Health.

"SEC. 2. Before the granting of such permits for interment, said undertaker or other person applying for said permit, must obtain from the physician who attended said deceased person, or in case no physician was in attendance upon such deceased person, then from the Commissioner of Health of said city, a certificate, stating the date of the death, the name, age, occupation, where born, in what state, county, and town, place of death, street, and number of street, ward, cause of death, duration of disease, sex, color, married or single, with the name of such physician or Commissioner of Health, and his place of residence affixed to such certificate, and no fees shall be charged by the Commissioner of Health for such certificate; and it shall be the duty of the Clerk of said Commissioner of Health to note in a book kept for such purpose, as near as possible, all the circumstances in relation to the deceased person, as provided in this section.

"SEC. 3. Such permit must in all cases accompany the removal of such deceased person to the place of interment, and must be delivered to the sexton or other person in charge of the cemetery, and be by him retained, before such interment takes place. It is likewise imperative on every undertaker in the city of Milwaukee, to furnish to the Commissioner of Health, or to the Clerk of the Commissioner of Health, a statement in writing on the first day of every month, of the number of his interments, with the names of such deceased persons.

"SEC. 4. For any omission, neglect or refusal to comply with any provision of sections one and two of this chapter, such undertaker, physician, Commissioner of Health, or other person, shall, on conviction, be punished by a fine of not less than twenty-five dollars, nor exceeding one hundred dollars; said fine to be prosecuted for and collected as other fines are imposed and collected, and to be paid into the treasury for the use of the cty of Milwaukee.

"SEC. 5. Every physician practicing within the limits of the city of Milwaukee, and who has attended any person in his or her last sickness, and the Commissioner of Health, in case no physician was in attendance, is hereby required to furnish to the undertaker, or other person who may have charge of the burial of such deceased person, an accurate statement embodying all the particulars required in section two of this chapter; and neglect, refusal, or omission by any such physician, or the Commissioner of Health, to furnish such statement, shall subject him to a penalty of not less than five dollars, nor more than fifty dollars, to be collected as other fines are collected, and paid into the city treasury.

"SEC. 6. The Clerk of the Commissioner of Health is hereby required to furnish proper printed forms for the certificates and permits required in sections one and two of this chapter, and to deliver the certificate forms to the Commissioner of Health, and to physicians, when called for, free of charge."*

Sections seven and eight pertaining to the burial of the dead within the limits of the city, are here omitted.

It is to be regretted that irregularities have gradually grown up, through ignorance or neglect of the law. All concerned will please make themselves familiar with these sections of the municipal statutes, for they will hereafter be strictly enforced.

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*This portion of the General Ordinances perhaps should have been included among the laws printed in the first chapter of this report, but the omission is supplied here where the matter especially belongs.

Experience proves that the whole business of the burial of the dead should be under the vigilant supervision of health authorities. Some time since, Milwaukee, wiser in this respect than many other cities, prohibited interments within the corporate limits. The necessary and solemn work of the undertaker should be subjected to the strict observance of wholesome sanitary regulations, with which irrational sentiment ought not to interfere. Religion welcomes protection to the living, while it erects the cross over the grave of the dead. While it comforts the mourner with hope, it consecrates the science that humbly endeavors to make the visitations of the great destroyer less frequent. Divine Providence sternly admonishes mankind to search out and obey the laws of health and life, by the irreparable calamities that follow ignorance of, and violation of, the same laws.

VI. THE CITY HOSPITAL.

At the first meeting of the Health Committee of the Common Council, after my appointment as Commissioner of Health, I was requested by resolution to examine the plans, by different architects, for a city hospital, and to report at the next session of the municipal legislative body. Ascertaining that there was marked diversity of opinion in regard to said plans, I determined to examine none of them, but to present my views on the general subject of hospital construction, leaving the city fathers to exercise their discretion in the matter. Ignorant of the fact that the architecture of a hospital had already become a subject of bitter and blind controversy, I presented myself at the next meeting of the Common Council, with some rapidly-made out-line plans of the new Berlin hospital, the Herbert hospital, and the Johns Hopkins hospital, as typical of the recent and most appaoved methods of hospital construction in Germany, England and America, ready to make a verbal and illustrated report, in response to the committee's resolution. The city law-makers refused to hear me at alll. They courteously passed a resolution that they meant no disrespect to me, that they were merely expressing their unwillingness to reopen a question that they had already settled.

LECTURE ON HOSPITALS.

A day or two afterwards, the Popular Science Society, of this city, invited me to lecture on the subject. I accepted the invitation. A leading journal gave a brief epitome of the lecture, as follows:

> His subiect, he acknowledged, was not an inviting one, but it was nevertheless an important one. The hospital, he said, was the outgrowth of Christianity;

before the Christian era, none had existed. It was the result of philanthropy—grew out of a tenderness for the sick and poor, and has grown up with the growth of ages. Some of the hospitals of Europe are a thousand years old, and built as well as the ancestors knew how—splendid structures, but not adapted to sanitary wants. A revolution has taken place in this respect, and modern hospitals are far different.

The first thing in a hospital is to secure air—plenty of it. A man cannot live half as many minutes without air as he can days without eating. Pure, fresh air is essential to life, and if the well need it, how much more the sick. In the second place, light. Plants refuse to grow in the dark. All nature demands light. The nervous system of every human being is fed on sunlight. An abuudance of sunlight is needed by every man as well as animal and plant. The third thing science demands of a hospital is the proper isolation of patients. It would be unwise to mix cases of small-pox, scarlet fever, and other diseases in the same room. Each disease should be confined to a separate and isolated ward. Patients should be so distributed that one cannot infect the other. Another point is ease of administration. The buildings should be so distributed that those in attendance can get with ease from one to another, and not with long journeys or tedious climbings. Another thing of interest, particularly to tax-payers, is that hospitals should be constructed economically. When $100,000 will answer equally well, $500,000 should not be squandered.

Premising that the pavilion plan of hospital was now in general adoption, Dr. Wight, at this point exhibited a ground plan of the great Berlin hospital, which is conceded to be the embodiment of German sanitary skill. The offices, or administration building, is at the front, with covered walks leading to twelve pavilions, or detached buildings, for hospital use, and also the kitchen, laundry, etc. This hospital the lecturer described at length. This hospital, he claimed, combined all the advantages of air, light and economy. One most excellent point he made in favor of the pavilion plan was that in case of an epidemic of malignant fever, it could be confined in one building, and then, the walls of that becoming incurably infected, it could be bodily moved away, and its place filled by a new one at a small expense. The plan of what is known as the Johns Hopkins hospital at Baltimore, was also submitted and explained. A plan of the Herbert hospital, at Woolwich, England, closed the illustrations.

In conclusion, Dr. Wight said: Sir J. R. Martin, M. D., who on hospital construction and management is one of the highest authorities in England, sums up a learned and thoughtful discussion of the subject in the following condensed and pointed way:

1. That no hospital shall consist, at most of more than two stories in height.

2. That by this arrangement the sick are spread over a wider area, the walls not being so high as to interfere with the ventilation and sunlight of

neighboring pavilions, while the accumulation of hospital miasm in the upper floors is avoided.

3. That the construction by two stories facilitates the access to the wards by patients and attendants, and the whole administration is rendered easy.

4. In constructing wards, they should be so built as to be flooded with sunlight, and the windows should bear a large proportion to the wall space of the hospital. Experience proves that window space ought not to be in a much less proportion to wall space of an hospital than one to two.

5. The free admission of light has everywhere been proved beneficial to health and conducive to cheerfulness; while, as is often observed in ill-constructed barracks and hospitals, the exclusion of light has proved detrimental to heatlh, directly, and also by retarding convalesence.

6. The best principle of hospital construction is that of separate pavilions, placed side by side or on line. The former is very preferable in large hospitals, for the reasons already stated, and there should be but two flats in a pavilion, and one ward to a flat. Pavilions are, in fact, separate hospitals, having a limited number of sick under one roof.

7. The form of the hospital should be an oblong square, the basement story of the pavilions being connected by a corridor, and the whole of the basement erected on arches. The pavilion plan is generally received on the continent as the sanitary necessity for hospital construction.

8. It is undesirable to increase the width of any ward beyond thirty feet, because the distance between the opposite windows becomes too great then for efficient ventilation.

9. Windows should be double or glazed with plate glass, to prevent loss of heat. Tripartite windows, like those of the Middlesex hospital, are useful for ventilation.

10. The ward walls should consist of pure white Parian cement, or some equally white non-absorbent substance. Grey-colored cements should be avoided; they never look clean and they give the ward a sombre appearance and hide dirt.

11. The best ward flooring is oak; and the joints of the flooring should be well fitted together, so as to be impervious.

12. No sawdust or other organic matter capable of rotting should be placed underneath hospital floors.

13. The floors should be beeswaxed or oiled and polished.

14. The general baths of the hospital should be separated from the pavilions, but connected with the corridor. They should contain hot and cold water, medicated, sulphurous, Turkish, vapor, shower and douche baths.

15. The kitchen should have walls and ceiling of Parian cement, or other such material.

16. There should be a head nurse's room and scullery attached to each ward, and storepresses outside the wards.

17. Bedsteads should be of iron, and supplied with hair mattrasses. The ward furniture should be of oak. Whether regarded as a means of securing sleep, rest, muscular relaxation or repose, the bed is a direct auxiliary to the cure, and too much care cannot be given to its construction and situation.

18. The ward construction now described is that which, up to the present time, experience has shown to be the best suited for fulfilling all the requirements of light, cheerfulness, recovery of health, and economy in this country.

19. One great advantage of the proposed system is that it admits of any arrangement of the pavilions on a plan which is consistent with light and ventilation. Hospital establishments so constructed may be added to without difficulty and without altering, or indeed without interfering with any of the existing pavilion buildings.

20. The principles of hospial construction here advocated are at variance with those of almost all the old hospitals of the three Kingdoms; but the whole question, in all its importance, is in the hands of the profession and the public, and observation, experience and free discussion will ere long determine what is just and true.

21. I have here confined myself to a consideration of the best known plans of hospital construction, believing that a review of second and third rate plans is but waste of time. In crowded cities we must be satisfied with what can be done; but I feel assured that, wherever practicable, such plan and arrangement as those of Miss Nightingale, will in the end prove the cheapest, whatever the price of the ground may be.

All the journals of the city, the leading members of the medical profession, and a great majority of intelligent citizens, coincided with the views of the Commissioner of Health on this subject. But the matter had gone too far to be reconsidered by the Common Council, and a contract was let by the Commissioners of Public Works, to construct the hospital according to a plan not in accordance with the demands of modern sanitary science. The building was erected by the contractor and accepted by the city authorities. The matter of heating and furnishing the hospital being under consideration, I was invited to the Mayor's office, to meet the committee on Public Buildings in consultation. The Common Council had been laboring under the delusion that they were providing a hospital large enough for sixty patients, or more. I stated frankly that the capacity of the four wards was not sufficient for twenty patients, without crowding. I also stated that the drainage was very defective, and, from a sanitary point of view, actually dangerous. A day or two afterwards, a prominent journal of the city, in reporting an interview with the architect, arraigned me for underrating the capacity of the institution and for calling in question its cess-pool arrangements.

DEFENCE.

The following communication, in which I am careful to wound a promising young architect the least possible, will speak for itself:

OFFICE OF THE COMMISSIONER OF HEALTH,
November 30, 1878.

To the Editor of the News:

An article on the local side of your paper, calls me to task for telling the truth about "the new hospital" in a committee the other evening. As the matter concerns the public, I respond to the charge.

It is not my theory that each patient in a hospital ward, requires 2,000 cubic feet of air-space. It is the theory of no individual. It is simply a requirement of sanitary science. "A great supply of air," says Dr. Parkes, the highest hygienic authority of England, "by immediately diluting and rapidly carrying away the morbid substances evolved in such quantities from the bodies and excretions of the sick, reduces the risk to its minimum, and perhaps removes it altogether. But the supply must be enormous; we are not in a position to say how much, but I question whether the large quantity of 4,000 cubic feet per head per hour, now assigned by the best observers, will not be found to be far below the proper amount for the acute and febrile diseases." Dr. de Chaumont, a very great authority in matters of this kind, says: "4,000 must be adopted for even ordinary cases of disease, and as much more as can be obtained for surgical or febrile diseases." The rule of 2,000 cubic feet of air-space to each patient in a hospital, is based upon another rule, that the air must be changed twice each hour, so as to give the patient the required 4,000 cubic feet of air. It is evident that if the air could be safely changed four times per hour, then 1,000 cubic feet of air-space would be enough. But it cannot be safely changed with such rapidity. Draughts or currents of air, would then be caused, dangerous to the well, still more dangerous to the sick. It is possible to change the air in rooms quite rapidly, without currents, but the process requires expensive machinery. Professor Pettenkofer, of Munich, has an experimental room, holding 424 feet of air, through which 2,640 cubic feet of air can be drawn in an hour by a steam engine, without perceptible draught. "With the best mechanical contrivance," says Dr. Parkes, "and with disregard of cost, we are therefore certain that a cubic space of 424 feet would be sufficient."

Your reporter makes the architect say: "The doctor was unmindful of the act that facilities of ventilation had been adopted, which secured a complete change of air in every fifteen or twenty minutes." If any such "facilities of ventilation" have been adopted, then the sick in the hospital will be subjected to dangerous currents of air. Admit the "fact," which I doubt, that "facilities of ventilation" exist there for entirely changing the air of a ward three times in an hour. In each of the wards there are 7,012½ cubic feet of air space. Multiply this space by three, on the supposition that the air can be entirely changed three times every hour, and we shall have 21,050 cubic feet of air per hour. Divide that number by 4,000, the requisite quantity per head per hour, and we shall have provision for 5¼ patients. As there are four wards in the hospital, the number of patients that may safely be treated in it, according to this supposition, is twenty-one. Allow the extreme and most improbable claim of the architect, that the air is changed every fifteen minutes, or four times an hour,* to be a "fact," and then the highest number would be twenty-nine. And in that case the draughts would be very dangerous. There is no escaping the conclusion, except by claiming to know more than the world's great sanitary authorities and denying that hospital patients require much air.

According to the safe rule of 2,000 cubic feet of air-space to each inmate, the new hospital can accommodate only 3½ patients to the ward, or fourteen in all. I told the committee that by considerable crowding and especial care, twenty patients might be admitted in case of necessity. I was correct, unless the architect knows more than the "rest of mankind" have learned by science and experience. A human being may live nine days without food, but a human being cannot live five minutes without air. The sick in hospitals must have plenty of pure air, which is better than all medicines.

I am even arraigned before the bar of public opinion for calling the cess-pool arrangement of the hospital in question. The whole drainage of the building, including half a dozen water.closets, is to a cess-pool less than a hundred feet from the front entrance. This cess-pool is ten feet deep and ten feet in diameter. It is bricked up and tightly covered. Under it, around it, over it, is impervious clay. It has no outlet and no ventilation. It is now more than half full of water. A drain-pipe with a water-trap and no ventilation leads to it from the building. As soon as the institution is occupied and human excreta are emptied into this cess-pool they will there undergo putrefactive fermentation and generate sewer-gas, which, having no escape, will force its way back into the building and poison the inmates. I pointed out this fact to the committee, and it was wisely resolved to run a drain-pipe from the cess-pool oft to lower ground, to perforate the cover of the same for the purpose of allowing the foul gas to escape, and to extend the soil-pipe up through the roof in order to secure complete ventilation of the water-closets. And yet I am accused of endangering the usefulness of the new hospital by pointing out the defect and insisting on the application of a proper remedy. If the aim of the institution was to smother the sick with foul air in over-crowded wards and to poison them with sewer-gas, then I plead guilty to interfering in the interest of humanity, not otherwise.*

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*And if such a rapid change of air were possible without dangerous currents, the heating power to keep it warm in winter would be very great.

The new hospital will be very useful as a winter pest-house for fifteen or twenty small-pox patients. If it is used for that purpose, of course it can be used for nothing else.

O. W. WIGHT, M. D.,
Commissioner of Health.

A LEGAL QUESTION.

In a report to the Committee of the Common Council, in response to an invitation to aid the Board of Works in preparing a list of needed furniture for the hospital, I raised the question whether the municipal government has a right to levy a tax for the building and maintaining of a hospital for any other purpose than the care of persons sick with contagious diseases, as a measure of protection to the public. "The question naturally arises, what class of patients shall be admitted to the hospital? In the absence of express legislation, it may be questioned whether the city has a right to establish a general hospital, for the care and treatment of patients at the public expense. For this purpose a county hospital is provided. It may also be questioned whether the city has any authority to go into the business of maintaining a hospital for paying patients. We are of the opinion that the municipal government has no legal power to establish a hospital either for charity or for gain.

"The municipal government, however, seems to have the power to establish a hospital for contagious and infectious diseases, as a measure for the protection of the public health. Persons in all large cities are sometimes afflicted with diseases dangerous to the community, who have no homes, who have no place to seek refuge in. For such the public must provide a place, in order to protect itself. A general hospital cannot properly receive contagious cases. There is need in this city of a hospital under control of the authorities, to which to send small-pox patients who cannot otherwise be easily and properly provided for. It is true that there has not been a case of small-pox in Milwaukee for many months, but no one can foretell how soon the dreaded disease may visit us, and it is wise to provide beforehand for what sooner or later must come. With such an end in view, the new hospital, notwithstanding grave defects of plan, may be made useful, and it is certainly a monument of municipal liberality and humanity."*

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*It has been said in response that the rain-pipe from the eaves runs into the drain and will ventilate it. When water is flowing from the roof, the rain-pipe will be flooded, and consequently useless for ventilation, just when the cess-pool is thereby being filled and ventilation is most needed.

Subsequently, heating apparatus and furniture were ordered by the Common Council for the hospital.

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*The report was ordered on file by the Common Council, Dec. 2, 1878.

VII. THE HOUSE OF CORRECTION.

This penal institution of Milwaukee County is located within the city limits, and its sanitary condition, therefore, comes under my jurisdiction. Its inmates, the number of which averages more than one hundred, are for the most part, from the dregs of society. The habits of many of them are filthy. A former superintendent informs me that, during the several years while he was in charge, more than fifty per cent of the prisoners were known to be laboring under some form of venereal disease. These transient convicts are liable to bring disease to the institution or to carry it away. Most of them are victims of intemperance and are broken down in constitution. Even if one had no benevolent care for their physical well-being, yet regard for the public would demand a sharp supervision of their sanitary surroundings. An outcast can disseminate typhoid fever, as well as a saint. A worthless tramp, let loose from prison, is likely to carry the seeds of incipient or half cured cholera a good deal farther than a respectable citizen. Contagious or infectious disease demonstrates, more conclusively than theology, the brotherhood of mankind. Self-protection, therefore, in the absence of a higher motive, admonishes any enlightened community to look well to the sanitary surroundings of paupers and criminals.

From time to time complaints were made to me, mostly by aggrieved citizens in the neighborhood, concerning the condition of the House of Correction and the practices of its officers, which at length culminated in the following

COMMUNICATION

to the governing authority of the County:

To the Honorable, the Board of Supervisors of Milwaukee County:

Complaint has been made at various times and by different citizens, that the House of Correction causes nuisance in the neighborhood. Early in the season an examiner from this office found that the wash-water of the institution was emptied through a drain-pipe into the gutter of Wind Lake Road, along which it ran sixty or seventy rods, not unfrequently making a stench offensive to all travelers on that highway. The secretions of the human skin, in a state of putrefactive decay, are not less dangerous than the secretions of the intestines and kidneys. The secretions of the skin are absorbed by underclothing and are removed by wash-water. I am informed that the inmates of the House of Correction number more than one hundred, on an average. Recruited from the criminal class of society, some of them are afflicted with the vilest diseases, and many of them are filthy in their habits. The water in which their clothing is washed must be more than usually foul. A long gutter full of this infected water, boiling down in the heat of summer, was not regarded as wholesome. An order was therefore issued by the Commissioner of Health to the Superintendent of the House of Correction to cease emptying wash-water in the public street and to run it into a cess-pool on the grounds of the institution. Accordingly, a large cess-pool was dug, but the ground being a stiff clay, it holds liquids instead of filtering them away.

Complaints having been repeated and urged by members of the city government, the Commissioner made a careful inspection of the premises last week. The waste water of the building runs in an open ditch to Becher street, where it makes a vast stinking mud-hole, extending to vacant lots beyond. The effluvium from this putrid marsh, covering an area of at least an acre, is offensive and unwholesome, and is hereby declared a public nuisance.

The privy on the premises, between the main building and the work-shop, is also a nuisance. In the vault thereof are more than twenty cords of human ordure, which, being covered only with a thin vaneering of plank and dirt, emits a huge volume of sewer-gas. When the sun shines the gas is rapidly oxidized and thereby consumed; but when the atmosphere is damp, especially in the night, it is widely diffused and becomes deleterious. Moreover, this great vault of putrefying human filth would become a potent center and source of infection in case any prisoner should reach the institution with enteric fever, cholera, or other disease, the germs of which multiply in and are communicated from accumulations of dejecta. One person introduced, afflicted with such a malady, would thus communicate it to other prisoners, and the constantly dispersing community of the penal institution would scatter it abroad in the community. Besides, such masses of putrefying human excrement are thought by many eminent sanitarians to be a primary source of typhoid fever. Dr. John Simon, of England,—and there is no higher authority in such matters,—says in his report of 1874 to the Privy Council, this fever "has an invariable source in that which of filth is the filthiest." If his views are correct, and perhaps the weight of medical opinion is on that side, Milwaukee is at any time liable to an epidemic of typhoid fever quite as destructive and terrible as the present epidemic of yellow fever at Memphis.

It is useless, perhaps worse than useless, to complain of sanitary evils, unless at the same time the proper remedies are pointed out. Permit me, then, to suggest to you what ought to be done at the House of Correction.

1. In the first place, the large privy vault, the contents of which have been accumulating two years, should be cleaned without delay, The ordure must not be washed out on to another part of the grounds, as it was more than two years ago. It must not be buried in the earth. Such a mass would remain there for hundreds of years,* as a vile source of poison. Citizens have already been prosecuted to conviction for such sanitary offenses. Institutions, even those belonging to the city, are not permitted to do what citizens are prohibited from doing. The makers and executors of laws must obey the laws. The Superintendent of the House of Correction should obtain a scavenger permit and have the contents of the vault removed beyond the city limits according to ordinances in such case made and provided. The accumulated contents cannot be run into a public sewer, thus making it an elongated cess-pool detrimental to the public health; thus choking it up so as to involve a large outlay of public money to clean it. Citizens have been prosecuted to conviction for this offence also. Allow me to refer you to an ordinance, entitled "an ordinance concerning scavengers," passed Oct. 29, 1877, by the Common Council of Milwaukee.

2. In the next place, the House of Correction should be connected with the sewer system of the city without delay. The honorable Commissioners of Public Works inform me that they are ready at once to construct a sewer from the corner of Third avenue along Wind Lake road as far as the House of Correction. The Superintendent of the Institution could begin at the same time to construct sewers, to lay soil-pipes, and waste pipes, and in a few weeks the connection could be made. The waste-water nuisance would then be abated. Only the privy-vault must not be connected with the public system until a proper sewer is constructed from the corner of Third avenue to the Kinnickinnic River. At present, there is only an open drain running along a natural water course in that direction. The people living near that open drain have a right to protest against running night soil through it. The waste water of the county prison might run through it temporarily, until the proper sewer can be completed there next year. But, until such a sewer is completed, the vault cannot be connected with the drainage of the buildings.

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*"A few years ago," says a distinguished engineer, "I was present at the excavation of the great Mastodon, near Cohoes. When we got down to where his trunk lay, 40 feet below the surface of the ground, the stench of the decayed animal matter was so great that we were obliged to hold our noses and some of the men were made sick at the stomach by it. And it was only a youngster at that; the scientists tell us that it had not been there over forty thousand years."—Sanitarium for August, 1878, p. 372. This privy-vault was bigger than a Mastodon.

3. Finally, the "excrement-sodden" soil on the slope towards Becher street should be under-drained thoroughly to the depth of five or six feet. Such under-drainage would aerate the soil and speedily purify it. Moreover, the manure of the stables on the place could then be mingled with the earth without making it offensive to the neighborhood. The ground, thus drained and enriched, would bear an abundant crop of vegetables, more than compensating for the outlay.

In compliance with the recommendation thus made, a sewerage permit was obtained from the Health Department, and one hundred and thirty cubic yards of night-soil were removed from the privy-vaults of the House of Correction. It will be impossible to extend the public sewers, so as to enable the superintendent of the prison to make connections therewith, until the opening of the season in 1879; at which time the vaults will again be cleaned and the other recommendations of the Commissioner of Health will be carried out.

Representatives of the County Government have had a formal consultation with me in regard to transferring syphalitic patients from the County Hospital to the House of Correction. As no person can be confined in the House of Correction except by sentence of a court after conviction for crime, such a transfer would be illegal. On the contrary, the Commissioner of Health has power to remove from the House of Correction any convict, suffering under contagious disease, to a place of safety, for the protection of the public, and will exercise the power in case of necessity.

VIII. A VISIT TO THE BUILDINGS AT THE COUNTY FARM.

At the earnest solicitation of a member of the County Board, chairman of the Committee on Poor, I visited the Almshouse, the Hospital, and the site of the new Insane Asylum, late in the autumn, not for the purpose of making an official inspection, for they are not within my sanitary jurisdiction; yet as Milwaukee city, which is the legitimate field of my work, has a very large interest in the public buildings of the county, I report the results of my visit. Of course I looked for nothing except conditions affecting health.

As the people pay their money for building and maintaining almshouses and hospitals, for the benefit of the poor and the sick, and not for the purpose of supporting officers in charge of the same, I shall give information with sole reference to the unfortunates, whatever may be its effect on superintendents and doctors who are placed over them. I suppose the people, who pay taxes, have a right to know whatever any citizen properly finds out and conscientiously communicates.

THE ALMSHOUSE.

I found the poor house very clean, and, contrary to my expectation, entirely free from sewer-gas, a name given to the effluvium that arises from human excreta and other organic matters in a state of putrefactive fermentation. The reason for this is that there are no privy-vaults in or near the building. The inmates go 200 feet or more to the rear of the premises, protected from the wind by high close board fences, where plain temples of Cloacina are entered by raised steps. There are no vaults beneath, filled with long-accumulated putrefactive ordure. The ground slopes away southward to an adjacent valley, the vegetation of which speedily transforms the drainage in summer, and the frosts of winter keep it from being harmful in winter. The superintendent told me that the filth under the elevated privies, on the surface of the ground, is removed once or twice a year, on to the farm, for manure. It would be a great improvement to cover it twice daily with dry earth or ashes and remove it to the land at least once a week.

I found that the wash-water is thrown out upon the ground to the east of the building. This kind of slop, on evaporation in the sun, leaves a sediment of excretion from the skin of the human body, which undergoes organic decay and becomes especially poisonous. The concentrated gas from this kind of filth will produce a fever, which, if not genuine typhus, is similar in its effects. In the cellar of the southwest wing of the building water not unfrequently accumulates from the overflow of an adjacent cistern. I advised the superintendent to sink a trench all around the building, lower than the cellars and foundations, and to lay down open-jointed drain-pipe for the purpose of removing sub-soil water and keeping the grounds dry. Into this drain the overflow of the cisterns, the kitchen slops and the wash-water, could be conducted by properly trapped waste-pipes. The ground slopes very rapidly to the south and therefore it would not be necessary to dig a long way in order to secure proper discharge of the drains.

The building is overcrowded, which is not the fault of the superintendent. The insane will be removed when the new hospital is finished next year, and this will relieve the overcrowding. The insane are locked up in separate cells at night and left without attendance. Considering that there are several epileptics among them, who should never be left alone, and some with suicidal tendencies, the public authorities should provide two night watchmen, one for the male and the other for the female department.

I dined from the food prepared for the inmates and found it good and wholesome. Each one had a bowl of nutritious soup, meat enough, and an abundance of bread and vegetables.

A neighboring hog-house, in charge of an old Englishman, one of the poor inmates, a trained and efficient swineherd, was cleaner than many dwellings that I have seen, free from smell, and the fine fat "porkers" were an attractive, and not a repulsive sight. The horse-barn and cow-stable were very clean and free from smell. I designated four windows that should be kept open a little way, to give the animals plenty of fresh air. Horses* and cows need, like human beings, an abundance of air, in order to remain in high health.

Upon the whole, the poor house of Milwaukee County, is in a remarkably wholesome condition, considering the great strain put upon its resources. The only evidence of the hated sewer-gas on the premises was in the private privy of the Superintendent's family, situated, fortunately, in one corner of the barn, far away from the main building occupied by the poor and the insane.

THE OLD HOSPITAL.

The old hospital building, now used for convalescents, was first visited. An overflowing, putrid privy-vault is not far from the ancient rookery, and is within thirty feet of the well. Only think of it! Typhoid fever has frequently been communicated to wells from privies sixty feet away. Cholera has been communicated to drinking water many feet through the subsoil. Kitchen slops are thrown on the ground, making a foul odor, near the well. An open drain carries the wash-water from the kitchen door down a slope into the field. The basement is unventilated, foul and damp. The building has no ventilation, except by windows that are rarely opened. The heating is by old-fashioned iron stoves. The scant space is overcrowded, and no wonder the convalescents are frequently returned to the main hospital on the hill beyond. The walls are noisy with rats that are fortunate in not being liable to human diseases. This old building, however, might be cleaned up, disinfected and used exclusively for a venereal hospital—in regard to which I will say something more pretty soon.

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*"The same evidence," says Dr. Parkes, Practical Hygiene, 1878, p. 94, "of the effect of pure and impure air on health and mortality is still more strikingly shown by horses; for in that case the question is more simple on account of the absolute similarity in different periods or places, of food, water, exercise and treatment. Formerly, in the French army, the mortality among the horses was enormous. Rossignal states that, previous to 1836, the mortality of the French cavalry horses varied from 180 to 197 per 1000 per annum. The enlargement of the stables, and the 'increased quantity of the ration of air,' reduced the loss in the next ten years to 68 per 1000. In the Italian war of 1859, M. Moulin, the chief veterinary surgeon, kept 10,000 horses many months in barracks open to the external air in place of closed stables. Scarcely any horses were sick, and only one case of glanders occurred.

"In the English cavalry (and in English racing stables) the same facts are well known. Wilkinson informs us that the annual mortality of cavalry horses, (which was formerly very great) is now reduced to 20 per 1000, of which one-half is from accidents and incurable diseases. Glanders and farcey have almost disappeared, and if a case occurs, it is considered evidence of neglect.

"In cow-houses and kennels similar facts are well known; disease and health are in the direct proportion of foul and pure air."

THE MAIN HOSPITAL

is quite an imposing building, not far away, on the summit of the hill. It is comparatively a new building; that is, it is not more than seven or eight years old. As I entered it, my nose was greeted with a smell compounded of hospital miasm, boiled cabbage and sewer-gas. The double windows evidently had not been opened during the entire day. There is no ventilation to speak of. Ineffectual ventilating shafts have been put in some time subsequent to the erection of the building, with a single opening through which foul air is expected to go out and fresh air come in. It was remarked to the attendant that there was evidently a great economy of holes in the wall. By way of excuse, the attendant said there was no use in opening windows, for the patients would shut them as fast as opened. From cellar to dome the air was foul, except in the unoccupied garret, where the windows were opened for the purpose of drying clothes. The heating is by hot air from three coal furnaces in the basement. The external opening of the box for the introduction of fresh air to the furnaces, for the purpose of heating it on its way to the close rooms in various parts of the building, was in an area below the ground, carefully enclosed, under a floor, beneath an opening tightly covered with double trap-doors. The inquiry was sarcastically made why they did not perfect the arrangement by introducing into the end of the box a pipe from one of the adjacent privy-vaults. The building is overcrowded, for which the officers of the hospital are not responsible. Rooms that have by far too little air-space for a single patient contain three. There are over seventy patients in the hospital, when the number of cubic feet of air-space is not sufficient for twenty-five. There are two privies standing against the ends of the two wings, with foul two-story vaults, so as to accommodate the patients on the upper as well as the lower wards. The vaults are not ventilated. They have not been cleaned during the whole season. The superintendent naively said he was waiting for cooler weather before cleaning them. Exposed to the heat of the sun on the south of the building, they generate great volumes of sewer-gas and sulphurated hydrogen gas, which pour into the wards, peopled densely by the helpless sick. "God help the poor!" one has occasion to exclaim at every turn of life. These two-story vaults should be cleaned and disinfected without delay, Then tight boxes should be run in on "stone-boats" through wide doors cut in the walls on a level with the ground outside; dry ashes or dry earth should be copiously thrown into the boxes twice daily; and every night in summer, and every week in winter, the "stone boats" with their foul loads should be drawn off on the "poor" farm, where the contents of the boxes might be mingled with the earth to undergo sanitary transformation in the alembic of nature. And I discovered a drain-pipe leading from the wash-room in the basement to a tightly closed cess-pool a hundred feet away in the yard. This "laundry" was filled with the death-odor of sewer-gas from the terribly foul cess-pool. It was so foul that when it was uncovered at my request, all retreated to a considerable distance, nauseated with the smell. It should be cleaned out, disinfected and filled up with wholesome earth. A sufficient drain-pipe should carry the water from the laundry, or wash-room, away to an adjacent field, to enrich the land, and a good trap should be inserted in the pipe near the building.

These improvements, however, cannot relieve the over crowding. Six thousand dollars, at the present time, when materials and labor are cheap, would build an outlying pavilion, connected by a covered corridor with the main hospital, that would give ample air-space, (2000 cubic feet to each) to sixty-four patients. It would, then, not be necessary to treat both sexes under the same roof and certain evils, discovered during my visit, which I do not wish to discuss here, would be obviated. And it is a shame that prostitutes, with venereal disease, should be sent to the county hospital, to mingle in the same building with respectable patients, who are simply unfortunate in their poverty. Let the old building, before described, be cleaned up, and reserved for the exclusive use of syphalitic harlots, of both sexes. The county hospital is really a monument of administrative imbecility and architectural ignorance.

THE NEW HOSPITAL FOR THE INSANE.

I visited the grounds for this prospective institution, which are across the highway, and partly beyond the poor farm, with its almshouse and hospital. The site consists of nearly ninety acres of elevated land, rolling, partly wooded, sloping down to the river on one side, finely exposed to sun and air. I have seen the plans of the building, which are admirable. Ground has just been broken for the new structure, and it is to be hoped that the contractor will be stringently overlooked by a competent and honest person. One mistake has already been made, whereby $2,000 or more of the people's money will be thrown away; the mistake of contracting for an artesian well. There are several artesian wells in this neighborhood; one near O'Neill's distillery, one in Forest Home Cemetery, one at the cattle yards of the Chicago, Milwaukee & St. Paul Railroad Company, and one on the premises of Col. Jacobs. The quality of water obtained from these artesian wells is of about the same quality. The waters of all of them contain sulphates of lime and magnesia, which render them unfit for washing and unwholesome for drinking. According to the reliable analysis of Professor Bode, the water from the Artesian well of Forest Home, contains in 1000 parts, 5.4190 parts of sulphate of magnesia and 18.8928 parts of sulphate of lime. These ingredients make what is called "permanent" hardness. The carbonates of lime and magnesia make only "temporary" hardness, which may be corrected by various means. The site of the new hospital is 150 feet above the level of of the Lake. By boring down 1300 feet—a little more or a little less—into the Potsdam sandstone, an abundance of water will be procured, but it will not flow to any considerable height above the surface, and it will be unfit for hospital use when obtained. We shall be fortunate if no worse blunder is made in the progress of the noble work, but it is an ominous beginning.

IX. ICE.

In the autumn, long before freezing weather came, this Department undertook to settle the ice question for the future. The dealers were called to the Health Office, one after another, in friendly consultation. They were given to understand that the ordinance forbidding the cutting of ice for dietetic use anywhere on the rivers below the influx of sewage would be strictly enfored. The ice men are to be commended for the readiness which they exhibited to obey the law.

It may not be known to the citizens in general where the sewage limits are. By consultation of a map of the city, on which the course of sewers is especially marked by the Commissioners of Public Works, it appears that the first sewer to empty into the Milwaukee river is at North street bridge, some little distance above the dam. Consequently all ice cut for "eating and drinking purposes," to use the language of the Ordinance, must be above North Avenue, so far as the Milwaukee river is concerned. The sewer fartherest up on the Menomonee river is at Twenty-seventh street. Hence no ice can be cut on that river for domestic use below the point indicated. The highest sewer on the Kinnickinnic, runs from the junction of Third Avenue and Windlake Road down to a point on the river above Robinson's dock. Icemen who have gathered their annual crop from that stream below that point, must therefore go elsewhere this year. Citizens will do well to take note of these geographical limits, and co-operate with the Health Department in order to protect themselves in the future, from eating and drinking a frozen compound of things unpleasant to meditate.

And the ice on the rivers above the points indicated is not absolutely pure. The Milwaukee river and its branches run a hundred miles through a thickly settled country, containing farms and villages, from which barn-yard slops, water fouled by manured lands, the drainage of privy vaults, of butchers' shops, of hog pens, etc., flow into the passing streams. Only a little way above the city are Lindwurm's distillery, Bergenthal's distillery, Heller's great "stink factory," the sugar refinery, and other industrial institutions, which deliver their waste and drainage into the river from which ice is cut. A little way up on the Menomonee are Meinier's distillery, the cow stables of Ries, two breweries, and still another distillery, large collections of cattle fattening on "still-slops," big hog yards, etc., which deliver their abominations into the flowing water. On the Kinnickinnic, within sight of the city, are the distilleries of Nunnemacher and Thomas O'Neill, the glue factory of Wahl, and also the great "stink factory" of Hermann & Co., the refuse of which by no means sweetens the water from which ice may be taken, to cool June butter and make mint juleps palatable. Yet existing laws do not enable the Health Commissioner to prohibit the cutting of ice for domestic use from these outlying sections of the three rivers that converge within the city. It is only enlightened and vigorous public sentiment that can entirely abate an evil from which Milwaukee has suffered more than it knows in the past.

With the view of providing an efficient remedy for things that cannot be entirely corrected by law, this Department early in the season encouraged the formation of a company for bringing into the city an abundance of pure ice. It is a source of congratulation to the people that such a company, with an abundance of capital and energy, was formed. This company purchased all the land around Random Lake, forty miles above the city, on the Wisconsin Central Railway, and is cutting this winter several hundred thousand tons of pure ice—in fact, just as much as may be needed. Thirty or forty men were sent before frost came, to lay a side track to the lake, and construct immense ice-houses. A contract was entered into with the Wisconsin Central Railway Company to bring an unlimited quantity of ice into the city at a moderate cost. The water of Random Lake is perfectly pure, and so clear that the clean sandy and gravelly bottom may be seen at a depth of twenty or thirty feet. Capitalists also organized a company to bring ice from Pewaukee Lake. The Chicago, Milwaukee and St. Paul Railway Company offered very favorable terms of transportation, and we are likely to see an abundance of pure ice coming from that direction also during the winter. Competing companies will keep the price down, and citizens will have cause to rejoice.

The Commissioner of Health also interviewed all the leading brewers of the city with reference to ice for "cooling purposes," as it is termed. He indicated that region of the Milwaukee river from North street to the Dam and from the Dam to Cherry street bridge, that portion of the Kinnickinnick from Railroad street to Robinson's docks and above, an expanse of the river connected with the lake south of Wolf and Davidson's ship-yard, and the Menomonee above Washington avenue, as places where ice might be cut, for the exclusive purpose of keeping breweries and slaughter-houses cool. On the lower portions of the rivers, where they receive great volumes of sewage from the city, where the water is foul and stinking with all kinds of abominations, the Commissioner would not allow ice to be cut for any purpose whatever. The brewers, are intelligent and enterprising men, and were ready to comply with the regulations, not only in their own interest, but in the interest of the public health also.

The Phillip Best Brewing Company purchased a tract of land along the border of Pewaukee Lake, on which they laid a side track for the purpose of hauling ice to be used in their several breweries. Their enterprise is to be highly commended. Others followed such a worthy example. The Josepn Schlitz Brewing Company erected five large ice houses on the west bank of the Milwaukee river, about midway between North street bridge and Humboldt, where it will cut a supply of ice sufficient for the requirements of its extensive brewery and bottling establishment.

It is now safe to congratulate the people of Milwaukee on the fact that they will henceforth have an opportunity to procure unquestionably pure ice for domestic use. They may also be safely congratulated upon the probability that in the future, frozen sewage will cease to be cut and hauled about the city.

The old notion that all foreign substances in water are precipitated when it freezes, is altogether exploded. Its saline contents are, to a great extent, sometimes wholly, precipitated in freezing, but the same is not true of all poisonous organic matters. Epidemics of entiric fever have been traced to the ice supply.

X. NUISANCE COURT.

The Health Office is necessarily the focus of complaints about nuisances. If any citizen considers himself aggrieved by his neighbor, on account of unpleasant smells or other sources of annoyance, he goes to the Department which has charge of such matters. Mrs. Flanagan throws slops in the alley, and Mrs. Sauerteig rushes to the Commissioner of Health and demands that her dirty neighbor shall be declared a nuisance. A studious clergyman is disturbed in his pious meditations by a stable in the rear of his library and writes an elaborate epistle to the Health Officer, demonstrating by logic and quotations from scripture that there is no hope of heaven for a man who keeps himself unclean on earth. A lawyer sends an indictment against his landlord for allowing a vault on the premises to become foul. A merchant complains that the odor of a hog pen reaches his new mansion. A pauper brings a piece of tainted meat, supplied by the contractor for furnishing provisions to the poor, and asks for the protection of the proper officer. One is distressed with the sickening smell of a neighboring soap factory. Another brings wormy flour purchased at a grocery. Mrs. Pickle comes to scold about Mrs. Fidget who lets her hens run at large in the back yards of neighbors. Dr. Teufelsdrock demands that the Commissioner shall suppress a certain blacksmith who has the impudence to practice medicine. A gentleman with a scientific turn of mind has discovered the "cadaver of a dead hen"—I quote his words—in the street and lectures the Department for permitting such things. A whole delegation of citizens complain that the alley in rear of their lots is filled with garbage and mud. A meek man seeks redress against a neighbor whose foul vault stains through a thick wall into the very room where he sleeps in the basement of his house. A widow in weeds sobs while she narrates that her landlord lets stagnant water stand two feet deep in the cellar of the house where she lives. A patient laborer brings a cup of milk, alive with *bacteria*, from the "dairy" of Herr Gotlos, who keeps his cows shut up in an unventilated stable and feeds them with nothing but "still-slops;" and wants to know if that is what makes his children sick. A Grand Avenue "nob," whose nose is still turned up in memory of "odoriferous vapors," demands that the Commissioner of Health shall instantly suppress several great packing-houses in which half a million of money is invested. And so on, to the end of a long chapter.

It would not do to let the complaints go unnoticed. To attend to them by visiting the parties complained of is an impossibillty. Such a course would require a hundred miles of travel every day. The complaints sometimes involve intricate questions of law and fact. Assistants might aid me, but I have desired to take personal cognizance of every case, in as much as I am personally responsible for its disposition.

Necessity is the mother of invention. At the very outset I instituted an informal nuisance court. During the period of eight months, from the last of April to the first of January, more than twelve hundred cases have been disposed of. A man comes in, who has a complaint to make. His name and residence are entered at once; also the name and residence of the party complained of. Then the complainant is sharply cross-questioned in order to ascertain facts, not mere opinion, as to the thing that the complaint embraces. Of course, the procedure being informal, oaths cannot be administered; but the complainant is warned as to the danger attending a false charge against his neighbor, and is informed that if a suit in the Criminal Court should grow out of the matter, he will be sent for to verify the substance of his accusation in a formal legal complaint. When the entry has been made, an order is written in a different colored ink, which the secretary understands. Sometimes, in a questionable case, the order is "to inspect," when an official inspector from the office is sent to look the matter up and make a formal written report. The reports already made by the inspector would fill a considerable volume. On most of the complaints an order is written to "send for him," which means that the secretary shall write an invitation for the party complained of to appear the next day to answer before the Commissioner of Health. The police each evening take out these invitations to all quarters of the city, and great praise is due Chief Kennedy for hearty co-operation in this respect.

The parties complained of appear in due time. They are then made acquainted with the charges. The name of the complainant is not given, in order to avoid the breeding of neighborhood quarrels. A few direct questions, going to the root of the matter, reveal whether the complaint is true, as it proves to be in at least nineteen cases out of twenty. An arrangement is almost invariably reached to abate a more or less important nuisance. Of course, frivolous complaints are dismissed without sending for the parties. The law violated is patiently explained to citizens and all are treated in a courteous and considerate manner. Sometimes, however, the authority of the Health Department is openly defied, in which case forbearance ceases to be a virtue. Nearly all nuisances are the results of carelessness or ignorance, and their authors only need a gentle admonition. For the real sanitary culprit, the man who wilfully asserts his right to maintain a nuisance, regardless of others, the Municipal Court, either in prospect or in reality, is the only proper remedy. The publicity attending a trial has more terror than a fine. No man likes to be arraigned as the author of a nuisance, injurious to his neighbors.

In this way, as was said above, more than twelve hundred cases of nuisance have been disposed of in eight months. In one case a lot covered with stagnant water is drained or filled; in another a foul cow-stable or hog-pen is cleaned and disinfected; in another a manure heap is removed from the city; in still another the vault of an overflowing privy is emptied by a scavenger, to the rejoicing of a suffering neighborhood. And for every one who has got into the "nuisance court," probably not less than a dozen neighbors, warned by his example, have cleaned up their premises without coming in contact with this Department. The effect is seen in all parts of the city and the sanitary improvement is manifest.

XI. STREET-SWEEPINGS.

The following communication to the Common Council is here printed, because it contains what I have to say at present on a subject of considerable importance.

OFFICE OF THE COMMISSIONER OF HEALTH,
December 13, 1878.

To the Honorable, the Common Council:

GENTLEMEN: I have this day received officially a copy of a resolution passed by your body, Dec. 9, 1878, which reads as follows:

> *Resolved*, That the Board of Public Works and the Commissioner of Health be and they are hereby instructed to examine into the matter of street cleaning, and report whether in their opinion the present method of cleaning the paved streets of the city is as economical, efficacious and conducive to the public health as if the work were done by means of street sweeping machinery; and, further, to report to this Council any information they may be able to obtain in relation to the cost of the last named method and necessary machinery.

This office has no information in regard to street-sweeping machines. So far as the public health is concerned, it makes no difference, in my judgment, whether a street is cleaned by machinery or by hand. The main point is that streets shall be frequently swept and that the sweepings shall be removed to some place where they can do no harm It is a well known fact that street-sweepings are composed in part of organic matter which, sooner or later, undergoes putrefactive decay and becomes injurious to health. The chief source of the organic matter is from the droppings of animals on the streets. It is a prevalent delusion that the excreta of horses can do no harm. In a fresh state, the manure of horses is generally dry and consequently emits very little odor. But as soon as it is mixed with water, from sprinkling streets or rain-fall, it passes into a state of fermentation and putrefactive decay. In such a condition it is like other matter of the kind.

Street-sweepings contain from 20 to 50 per cent. of organic matter. When allowed to remain on public highways, partly liquified with moisture, kneaded by the hoofs of animals and the wheels of vehicles, and steeping in the sun, they not only emit gases injurious to the public, but also soak into wooden pavements and the ground, making wide-spread accumulations of filth. When storms wash the dirt of streets into gutters and sewers, the volume of abominations poured into the open rivers is thereby increased. And when, in continued dry weather, the manure of horses is dried and pulverized the wind blows it about, to penetrate the clothes and lungs of pedestrians. For these reasons, streets should be frequently swept; whether by machinery or hand, the Board of Public Works can tell you better than I can.

One thing is certain—the sweepings of streets should not be used for filling low places and vacant lots. Such places usually contain an abundance of moisture, and an accumulation of wet street-sweepings is but little if any better than a rotting manure heap. Houses built upon such "made ground" are especially unhealthy. The ground-air comes up freighted with poisonous gases from the decaying organic matter below, filling the habitations of unsuspecting people, intensifying if not producing many diseases that flourish in the midst of filth and "grow by what they feed on." I have therefore forbidden ward-foremen to use dirt collected from streets, gutters, and catch-basins for filling, whenever any such sanitary transgressions have come to my knowledge. Respectfully submitted,

O. W. WIGHT, M. D.,
Commissioner of Health.

XII. GARBAGE.

"There are," says Mr. Simon, the greatest of sanitarians, "groups of houses, there are whole villages, there are considerable sections of towns, there are even entire and not small towns, where general slovenliness in everything which relates to the removal of refuse matter, slovenliness which in very many cases amounts to utter bestiality or neglect, is the local habit; where, within or just outside each house or in spaces common to many houses, lies for an indefinite time, undergoing foetid decomposition, more or less of the putrefiable refuse which house-life, and some sorts of trade-life, produce; excrement of man and brute, and garbage of all sorts, and ponded slop waters; sometimes lying bare on the common surface; sometimes unintentionally stored out of sight and recollection in drains or sewers which cannot carry them away; sometimes held in receptacles specially provided to favour accumulation, as privy-pits and other cess-pools for excrement and slop water, and so-called dust-bins receiving kitchen refuse and other filth. And with this state of things, be it on large or on small scale, two chief sources of danger to life arise; one, that volatile effluvia from the refuse pollute the surrounding air and everything which it contains; the other, that the liquid parts of the refuse pass by soakage or leakage into the surrounding soil, to mingle there, of course, with whatever water the soil yields, and in certain cases thus to occasion the deadliest pollution of wells and springs."

When I first took charge of the Health Department of Milwaukee, large neighborhoods in various parts of the city, were in a condition like that described by Mr. Simon. The law made it my duty to advertise for proposals to remove garbage in all the wards. I did advertise in due form, and at the proper time. Bids were received and opened on the day fixed. It was then the legal duty of the Commissioner to pass the bids for each ward over to the committee of that ward, as the three aldermen of the ward are called. The ward committee had to say whether they would have a contract let. Without their sanction, the Commissioner of Health could not let a contract. Nearly all the ward committees this year refused to have such a contract let. Consequently the garbage was not removed, except in a small way by the swill-children. Hence, garbage accumulated all over the city, creating an offensive, unwholesome nuisance. The stuff was thrown in the alleys or stood, full of maggots and stinking, in swill barrels by the fence in the back yard.

Children who gather swill from the houses of citizens were relied upon to remove garbage. A triple evil thus seemed likely to be perpetuated; (1) a degrading occupation of poor children, (2) polluting accumulations ofrefuse, and (3) the keeping of swine in the whole city.

Children who collect swill about the city are to be pitied. They are shunned by other children and lose self-respect. Many of them are tempted to steal and become thieves. Thus they are brought up to a species of vagabondage and swell the numbers of bad citizens. If the parents are unable to keep them at school it would be far better to put them at some kind of respectable and wholesome employment. To rely upon them to remove the garbage from a large city is absurd. They take it from less than one-third of the houses and leave it at the rest. And the gathering of swill contributes to another distressing nuisance. It enables people to keep hogs. These animals in a large city are a nuisance of the worst kind. They make whole neighborhoods pestilential, especially in hot weather. The inevitable smell arising from their pens is not merely disagreeable, it is unhealthy. And it stands to reason that the flesh of these animals, when fed wholly on garbage, is unfit for human food. They swelter in close dirty pens during the dog days and become a feverish mass of disease. The use of their flesh for food generates a list of diseases too long to recapitulate. If hogs were kept only by the poor some compassion would be due to the needy. Eight out of ten who keep swine are not poor. The men who make the most fuss about their removal are well off, and in no sense dependent on the degrading occupation of swill-children for a livelihood. A few of the poor may suffer by the removal of swine, but let property-owners in the vicinity of hog-pens, whose possessions will be enhanced by the abatement of the nuisance, remember the deserving and aid them in the best of all ways, by giving them and their children honest employment. I have seen girls ripening towards womanhood, gathering swill for indolent fathers or brutal employers, who loaf at home in the shade of a reeking hog-pen, apparently living on the interest of the stink.

After a determined effort, in which many suffering citizens joined, an ordinance was passed, authorizing the Commissioner of Health to let a contract for removing garbage from the whole city. The good work was completed soon afterwards by the passage of an ordinance to prohibit the keeping of swine at all in the more densely populated part of the city, and restricting the number to two anywhere within the limits, thus leaving to the poor man a pair of pigs in the outskirts of the town. Both ordinances will be found in the chapter containing the laws governing the Health Department.

In order to complete the history of this important matter, I here reproduce the following

COMMUNICATION TO THE COMMON COUNCIL:

OFFICE OF COMMISSIONER OF HEALTH,
MILWAUKEE, Sept. 12, 1878.

To the Honorable, the Common Council:

GENTLEMEN—I herewith transmit to you for final approval a proposed contract, drawn by the City Attorney, in pursuance of an ordinance, entitled "An ordinance to provide for the removal of garbage from the city of Milwaukee," passed Sept. 2, 1878.

Under the ordinance bids were solicited by advertisement in the official papers of the city. The lowest bid was three thousand one hundred and twenty ($3120) for removing garbage from the whole city, for one year, according to the requirements of the ordinance and in conformity with regulations which appear as a part of the proposed contract. It is gratifying to be able to communicate the fact to the Common Council that the contract price is more than one thousand dollars ($1000) less than the aggregate lowest bids for the whole city by wards under the old system. Besides, the proposed contract, under the new ordinance, requires the removal of garbage every day during the warmer half of the year, while under the old system the removal was made only twice a week. It will also be noticed that the regulations are far more stringent than under the superceded law, and are therefore more likely to secure efficient public service. The bond of five thousand dollars is ample to ensure fulfillment of contract.

Moreover, the responsibility will be concentrated under the new system. If citizens have cause to complain, the Commissioner of Health will be directly amenable; and, in turn, to him will be answerable a single contractor with a sufficient bond behind him. It will henceforth be easy to do well what has hitherto been done very imperfectly or not done at all. With divided responsibility efficient administration is never secured. We may therefore confidently expect that a great nuisance, distressing to thousands of citizens, costly to many individuals, will henceforth be abated economically and effectively, and a fruitful source of unwholesomeness removed. In the proposed contract is included the removal of dead animals, which has hitherto cost the city a separate sum of three hundred dollars ($300) a year. Deduct this from the price bid and the remainder is $2820, which is $1308 less than the lowest bid for removing garbage from the city by ward contracts. The cost will be less than three cents a head for the people of the whole city. During the last year $1948.80 were paid for the removal of garbage from five wards. Add to this sum the $300 paid for removing dead animals and we have $2248.80. Deduct that amount from $3120, and the difference of $871.20 shows the small cost of removing garbage from the eight remaining wards under the proposed contract. This important element of economy is already apparent and indicates the wisdom and forecast of the Common Council in passing an ordinance to cure a great public evil in a businesslike manner.

CONTRACT.

The Common Council approved the contract, which reads as follows:

Articles of Agreement made and entered into this 30th day of September, A. D., 1878, by and between Joseph Hermann, Rudolph Gumz and Joseph Schaaf, copartners, doing business in the city of Milwaukee by the firm name of Joseph Hermann & Co., of the first part, Pius Dreher and William Fink, of the second part, and the city of Milwaukee, of the third part:

1st. The said parties of the first part in consideration of the payments hereinafter stipulated to be made by the said party of the third part, hereby covenant and agree to and with said party of the third part, to collect and remove from the city of Milwaukee all garbage, offal and dead animals, for the term of one year from and after the date of this contract, according to the rules and regulations for the removal of garbage, on file in the office of the Commissioner of Health, in and for the city of Milwaukee, such collection and removal to be made every day from the 20th day of April to the 20th day of October, and at least twice a week during the residue of the year.

2d. In consideration of the service hereinbefore stipulated to be performed by the said parties of the first part, the said party of the third part, hereby stipulates, covenants and agrees to and with said parties of the first part, to pay to said parties of the first part for such services during said term, the aggregate sum and price of three thousand one hundred and twenty dollars in monthly instalments and in city orders of the city of Milwaukee drawn and issued pursuant to the charter of said city.

3d. In consideration of the awarding of this contract to the said parties of the first part, the said parties of the second part hereby covenant and agree to and with said parties of the third part, that said parties of the first part will well and faithfully perform and fulfill this contract on their part, and that they will pay on demand to said party of the third part, all damages which the said parties of the first part may lawfully incur by reason of any failure on their part to perform and fulfill this contract according to the true intent and meaning hereof, not to exceed the sum of five thousand dollars.

It is mutually agreed and understood that this contract is made expressly subject to the approval of the Common Council of the City of Milwaukee.

In testimony whereof the parties of the first and second parts have hereunto set their hands and seals and the party of the third part has caused these presents to be sealed with its corporate seal and signed by its Commissioner of Health the day and year first above written.

Signed, sealed and delivered in presence of

[SEAL.] E. W. DIERCKS,

JOSEPH HERMANN, [SEAL.]
JOSEPH SCHAAF, [SEAL.]
RUDOLPH GUMZ, [SEAL.]
PIUS DREHER, [SEAL.]
WM. FINK, [SEAL.]

O. W. WIGHT,
Commissioner of Health.

MILWAUKEE COUNTY, SS:

Pius Dreher and William Fink being duly sworn doth each for himself depose and say that he is one of the sureties who executed the foregoing contract as one of the parties of the second part therein named, and that he is worth the sum of five thousand dollars over and above all his debts and liabilities in property in the city of Milwaukee, not by law exempt from execution.

Subscribed and sworn to before me this thirtieth day of September, A. D., 1878.

PIUS DREHER,
WM. FINK.

E. W. DIERCKS,
Notary Public, Milwaukee Co., Wis.

Under this contract, there were removed from the city 235½ loads of garbage and 76 dead animals, during the month of October; 204¾ loads of garbage and 87 dead animals, during the month of November, and 189 loads of garbage and 90 dead animals, during the month of December. The fines imposed, during the three months, for neglect, amounted to $48, which sum was deducted from payments to the contractors.

XIII. MIDWIVES.

It has been the custom of this Department, previous to my administration, to endorse all death certificates of still-born infants, coming in from midwives, and to issue burial permits on the same. Noticing that the percentage of the still-born was too large for the total death rate, I carefully investigated the matter and came to the conclusion that many women in this community were practicing midwifery without the proper qualifications. In order to shield poor people from a needless danger, and at the same time to protect the properly qualified women in their usefulness, I set about the difficult and delicate task of sorting the white sheep from the black. As my signature on the death certificate, in case of attendance by a midwife, was necessary before a burial permit could be issued, I refused to sign any such certificate until the midwife sending it in could substantiate her qualifications to practice her art. The good midwives responded with alacrity to a call from the office to appear and show their credentials. Many exhibited diplomas, regularly issued by the proper medical authorities of Germany. Others were able to bring the endorsements of respectable physicians in this city, who had personal knowledge of their fitness to practice. A few, who had no diplomas and could not bring satisfactory recommendations, passed a satisfactory examination in this office. All of these were enrolled in a list of the approved. Those without credentials and unable to bear an examination were placed in a list of the rejected.

Now if a certificate of stillbirth comes to the office from a midwife whose name is in the list of the approved, the certificate is endorsed by the Commissioner of Health and a burial permit is issued. On the other hand, if such a certificate comes from a woman assuming to be a midwife, whose name is in the list of the rejected, her work is turned over to the coroner. The result is that the people no longer employ those who may subject them to an inquest. The practice of those who are properly qualified is increased. The percentage of stillbirths is growing less. Poor mothers in the hour of peril are safer. Women who were in the habit of assuming duties for which they were not properly educated, are turning their attention to occupations wherein they may be more useful and less dangerous to the public.

I wish I had the same power to sort male practitioners, to make a white list of useful physicians and a black list of pretenders. If the death work of quacks could be peremptorily passed over to the coroner, not only in obstetrics but also in every department of practice, the community would soon be rid of a great and perilous nuisance.

CRIMINAL ABORTION.

Midwives in this city have been falsely accused as especial perpetrators of this crime. This office has no information tending to substantiate such a grave charge. The educated midwives of Milwaukee are, as a class, conscientious, laborious, useful women. They practice among a class least of all given to the crime of abortion. In fact, our population is largely foreign, largely Catholic, and there is probably no city in this country freer from this revolting practice. It is not unknown here, but its records are kept in a great book that will not be opened till the terrible day of judgment. The crime is perpetrated in secret, and its helpless victims receive no public burial. Consequently, this Department has no special means of investigating it. My only wish in touching the subject at all is to vindicate the good midwives from a baseless accusation and to bear testimony to the comparatively good character of Milwaukee in this respect.

XIV. PRIVY-VAULTS.

"It seems unaccountable to me," pithily says Dr. Downes, of Nottingham, New Hampshire, "that man, with all his boasted progress, has not yet generally acquired that degree of sanitary knowledge, *somehow* obtained by the cat, and acted upon by it, within the first three months of its existence. There is an article in my own personal creed, that no one has the right to pollute the atmosphere, or the water, which a bountiful Creator has provided for the common use of his creatures."

The Health Department has sent out of the city, during the year 1878, nearly three thousand tons of human ordure. Milwaukee, to that extent, has been relieved of "that which of filth is filthiest," to use the expression of Dr. Simon. Yet ten thousand tons—perhaps twice that amount—still remain, which ought to be sent beyond the limits without delay.

This is really the most dangerous nuisance in the city. The vaults are scattered everywhere. Consequently the nuisance is found in every occupied block. Most of the vaults are without cement floors and the enclosing walls are not tight. The earth beneath and around them drinks up the liquid filth, till it becomes "excrement-soden." Wells in the vicinity are poisoned. The exhalation of organic vapor from the filth-temples and the adjacent grounds, at least enrich the soil in the bodies of human beings who breath it for the seeds of disease, if it does not generate disease itself. Every neighborhood, where the back yards contain foul privies, is a haunt of diphtheria and other filth-fed maladies.

In water-closets, the excrement is constantly removed by a copious flow of water. About six gallons of water are used for this purpose by each person in twenty-four hours. If the sewers are properly constructed, the filth is floated out of the city, before it has time to undergo putrefactive fermentation and thus become poisonous. Excrement, when fresh, is lighter than water and will float. After it is soaked, it becomes heavier than water and will sink. When water-closets are properly constructed, when the soil pipes of a house are properly arranged, when connections with the public sewerage system are properly made, and when the sewers themselves fulfill the conditions imposed by sanitary engineering, then the excreta and organic matters of the household will be entirely removed, without becoming a nuisance or a danger to any one on the way. Appliances to secure such an end should be required by the public authority. In no other way can the inhabitants of cities be secured against the negligence of one another in things most essential to comfort and health.

In privy vaults, foul matters necessarily accumulate and undergo putrefactive fermentation. In them flourish the microscopic organisms that beget pestilence. Perhaps they are a necessary evil. At all events, they will exist until sanitary knowledge is much more widely diffused than at present.

The first mitigation of the evil is frequent cleaning. "In all forms of fixed closets," says Dr. Radcliffe, an experienced sanitarian, "the foremost condition—the one to which all other considerations should yield, is the *frequency of removal of deposited excrements.*"

The second mitigation of the evil is to keep the "fixed closets" as dry as possible. The wettest vaults are, as a rule, the foulest, the worst smelling, and the most dangerous. House-slops, wash-water, etc., should not be poured into the privy. It is a very wholesome and convenient disposal of ashes to put them into the vault. If the privy, as Col. Waring says, "is used only for its legitimate purpose, if no liquid matter of any sort be poured into it, and if it have a copious daily sprinkling of ashes or dry earth, it will be free from sanitary objections. But if these precautions are not adopted and carried into effect under a rigid supervision, there is certainly no single apurtenance of the life of an ordinary household so frought with danger and annoyance to all who live within reach of its influence."

Finally, the third mitigation of the evil is to line the vault with a water-tight coating of hydraulic cement and to keep the contents thoroughly disinfected with sulphate of iron, carbolic acid or fresh lime. It must not be forgotten, however, that so-called disinfectants, too often, only serve the purpose of disguising poisonous gases. As Dr. Simon says of habitations, "It cannot be too distinctly understood that *cleanliness* and *ventilation* and *dryness*, are the proper deodorizers * * * and that artificial deodorizers will no more serve in their stead than, in regard of perfumes, these could serve instead of soap and water."

Many people are under the impression that it is not necessary to clean privy-vaults till they are full. They pay little or no attention to disinfecting. They are not aware of the fact that the drier the contents are the less harmful they are. Again and again, a citizen has honestly said to me: "There is nothing but water in my privy and it don't want cleaning." The practice hitherto in this city has been to allow vaults to remain uncleaned till they are running-over full. Even then the owners not unfrequently demur to an order from the Health Department to clean. Many have been in the habit of covering up full vaults with a little dirt, and digging new vaults. There are probably ten thousand graves of this kind in the city, which will poison the earth for many years to come. Some of the vaults are connected by a pipe with the public sewers, into which the contents are washed with a hose when complaint is made that they are full. Such connections have been winked at or openly permitted by the authorities in the past. To run the accumulated contents of a privy-vault into the sewers is a sanitary crime against the public, which under no circumstances should be tolerated. Instances have come under my official observation where proprietors of tenement houses have run five, ten, even twenty tons of putrid, deliquescent excreta—the contents of huge vaults accumulated for a dozen years—into the sewers, in spite of my utmost endeavor to prevent such offences against the public health. Honest citizens, ignorant of sanitary science, think they have a right to do such things. A licensed scavenger has just as much right to dump his load of night-soil off a bridge into the river. In fact, such a procedure would be far less harmless than running the contents of a privy-vault into a sewer, where they might poison a whole neighborhood with their gases, before flowing—a putrid, lazy stream—down a gentle slope to the river.

Henceforth, laws forbidding the burial of privy-vaults or the emptying of their contents into the public sewers will be strictly enforced.

Two practical ways occur to me, whereby the great and dangerous privy nuisance in the city can be abated.

1. Every privy may be cleaned every year. By the provisions of the existing scavenger ordinance, the price allowed to licensed scavengers for cleaning, to be paid by the citizens, is three dollars for every cubic yard of night-soil removed. As the charge is by the quantity, it will cost no more to have a vault cleaned every year for half a dozen years, than it will to have it cleaned but once at the end of that time. There will be six times us much in it at the end of six years as there will be at the end of one year. So no objection can be made to frequency of cleaning on the important ground of cost. In fact, if the Commissioner should order all vaults cleaned, street by street, house by house, every year, the scavengers, in consideration of a regular instead of a miscellaneous business, would willingly accept a reduction of the price from three dollars to two dollars per cubic yard. Citizens would thus save one-third of the expense. The vaults would then be kept a good deal cleaner than they now are, if not as clean as they ought to be. The city would certainly be less liable to epidemics of "filth diseases," especially if annual disinfecting were added to cleaning. Citizens would then all be served alike and no complaint of discrimination could arise. It now sometimes happens that a complaint comes to the Health Office against a man for having an offensive privy and an order is issued to him to procure a scavenger permit and get it cleaned, when he knows, what the Commissioner does not know, that his neighbor has a privy just as bad and is not ordered to do the same. Therefore he concludes that partiality is

shown and honestly entertains hard feelings towards the public authority, when the Health Department is wholly unconscious of any fault.

For these reasons, the plan of a general annual cleaning has many advantages over the present system of paying no attention to privy vaults till they are complained of by neighbors who can no longer endure the nuisance. I have explained this plan to many citizens, who, without a single exception, have approved it. The work would be very heavy the first year, but after that it would be very light.

2. In my judgment, a better and, in the end, a cheaper plan, would be to have all vaults in the city cleaned out and filled up with fresh earth at the expense of the owners; to require a light, tight box, to be placed under each seat of the outhouses, easily accessible by short doors in the rear, also at the expense of the owner; and then to remove the contents of all the boxes once a week, at the public expense. The cost would not be large after the plan was in operation. Ashes should also be put into the boxes, which would be an excellent means of dry disinfecting, rendering the removal easy and inoffensive. For the purpose of such removal, the city might be divided into thirteen districts, by wards. Contractors could be found who would undertake the work for five hundred dollars, or less, per year, for each ward. The aggregate cost, at that rate, would be sixty-five hundred dollars for the whole city. As the water-works and sewerage are extended, the expense would become less, especially if a charge were made for these public conveniences, whether citizens used them or not.

This plan, I am convinced, is perfectly feasible. It would require some energy and firmness to set it going, but, when once under way, would be satisfactory. It seems to me an easy method of getting rid of our greatest nuisance. The plan is not wholly new. It has been successfully tried in Hull, England. Mr. Radcliffe, in a report on the subject, says: "For the purposes of 'night-soil collection,' the borough is divided into forty-eight districts, each containing from three hundred to seven hundred houses, the total number of houses enumerated for the purposes of this collection in

1873, being 30,977. The collection is carried out by the sanitary authority through the agency of contractors. As a rule, each district is let out to a separate contractor, and no contractor is allowed to undertake more than two districts. The smaller districts are so arranged that the collection may be carried out by any one who has the command of a horse and cart, and who can have the assistance of a boy or two. * * * The work of collection and removal is to be executed on week days, from the beginning of March to the end of October, between the hours of 5 and 8:30 A. M., and from the beginning of November to the end of February, between the hours of 6 and 9:30 A. M., and all carts employed in the work are to be clear of the streets and public thoroughfares, on their way to the depots, before 9 A. M., within the former period, and before 10 A. M , within the latter period. Further, the contractor is required to use water-tight and properly covered carts."

I have no doubt that nine-tenths of the citizens of Milwaukee would vote to carry out either of these plans, if the matter could be brought clearly before their minds. Economy, public health, every consideration of decency, commend to the people a co-operative system of removing from the city its worst and most perilous filth.

"It is indeed surprising," says Mr. Denton, "that so many receptacles of putrefying human excrements as are known still to exist, should be allowed to remain in the midst of populations in spite of our progress in sanitary science in recent years." Dr. Simon, in his Supplementary Report to the Local Government Board, 1874, describes the privy as follows: "Either it has had no other catchment apparatus than the bare earth beneath the privy seat, * * * * or else it has had as supplement to the privy, a large enclosed midden-stead or cess-pool, partly or entirely of brickwork or masonry, intended to retain large accumulations of the solid filth, with or without the ashes and other dry refuse of the house, and in general dividing its fluid between an escape channel especially provided and such soakage and leakage in other directions as the construction has undesidnedly or designedly almost always permitted. Privies such as these have not been meant to have their filth removed except where its mere largeness of bulk (exceeding or threatening to exceed the limits of the privy pit, or cess-pool, or midden,) might mechanically make removal necessary. * * * * What nuisance this system at present constitutes in innumerable populous places, including some of our largest towns, can indeed hardly be conceived by persons who do not know it in operation, and the infective pollutions of air and water supply which it occasions to an immense extent in towns and villages throughout the country are chief means of spreading in such places some of the most fatal of filth diseases."*

It certainly should not be left within the power of a minority to subject any community to this greatest of nuisances. Therefore the legislature of the state ought to empower the health authority of each city to cause the removal, in a systematic way, of such dangerous filth. When the plague is hovering on the horizon of civilization in Asiatic cities, with so much threatening that the imperial governments at Berlin and Vienna concert measures together to guard their frontiers against its advances, when one-half of our country is in mourning from very recent visitation of pestilence, the renewal of which is feared, we are warned to use the ounce of prevention that, from every point of view, is so much better than the costly pound of cure.

*Sanitary Engineering, by J. Bailey Denton, p. 218.

XV. ADULTERATIONS OF FOOD AND DRINK.

As exaggerated notions are entertained in regard to the extent to which food and drink are adulterated, it is proper to give sufficient attention to the subject to allay needless apprehension and to direct investigations in the right channel. Dishonest tradesmen have existed since the beginning of commerce, still exist, and will exist till human nature is radically changed. But in this respect, as in many other respects, the world is growing better and wiser. There is no doubt that advancement in chemical science enables purveyors of food and drink to adulterate with increased skill, but it also facilitates detection. There is nothing hidden under the sun that shall not be revealed. Other sciences, besides chemistry, aid the investigators of fraud, but, unlike chemistry, do not increase the means of its perpetration. The microscope, in trained hands, will reveal many adultrations, but will not teach any man how to practice them. Spectrum analysis in due time will probably make the detection of any possible adulteration easy, swift and certain, but will never give instruction to any knave in methods of mixing cheaper or deleterious substances with articles sold to eat and drink. The ways of Providence are vindicated to the most skeptical mind, when we learn that increase of safety comes with the increase of knowledge.

Of laws to punish adulterations we have an abundance. It is only necessary to enforce them, when fraud is detected. And self-interest will prevent practices that are dishonest and dangerous to the public health, when the work of detection becomes easy.

Guided by Dr. Parkes, who is an eminent authority on this subject, and is not at all given to exaggeration, I will here mention the adulterations to which the usual articles of food and drink are sometimes subjected and the means of detection. The reader will find the subject of food discussed at length in Dr. Parke's admirable treatise on Practical Hygiene, pp. 186—277. The excellent works of Dr. Letheby, of Dr. Edward Smith and of Dr. Pavy, will safely guide any one who wishes to make a thorough study of foods.

WHEAT FLOUR.

This is sometimes adulterated by the addition of barley, potato, bean, pea, maize, oat, or rye flour. In some countries rice, buckwheat, millet, melampyrum, or lolium flour is mixed with it. Nearly all of these adulterations can be easily detected with the microscope. Some of them can be detected by the smell when mixing the flour with hot water, others by the result in making bread. Mineral substances, as alum, plaster of paris, clay, powdered flint, the carbonates of lime and magnesia, are used to cheapen or add weight to flour. These substances must be detected by chemistry. "Rice, potato starch, and pea flour," says Dr. Edward Smith, Foods, p. 173, "are readily ascertained under the microscope by the form of the granules; plaster of paris, by being insoluble when the flour has been washed in water and separated for analysis; alum, by dipping a slice of bread into a watery solution of logwood, when a claret color will be produced if alum be present; and the sulphate of copper, by the color of Prussian blue, which is produced when prussiate of potash is added to a solution of the bread in water."

In Milwaukee, the largest primary wheat market in the world, there is very little adulterated flour. Here, "the art of the miller consists," again to borrow the language of Dr. Smith, "not less in properly mixing the kinds of grain to produce the best flour, than in well grinding and preparing it for food, and offers scope for intelligence and knowledge."

BREAD.

The most common adulteration of bread is by alum. It is not difficult to determine the presence of alum in bread, but to ascertain the amount by quantitative analysis is an intricate problem of chemistry. Methods have been given by Hassall, Horsly, Hadow, Dupre, Odling, Crookes, Letheby, Kuhlmann, and Wanklyn, which need not be repeated here. Horsely, Hadow and Letheby have used a decoction of logwood, in order to ascertain the presence of alum. Make a fresh decoction of logwood, strain it into a glass, and put in the liquid two pieces of bread, one known to be pure, and the other the suspected piece to be tested. At the end of twenty-four hours, the pure bread will be simply stained, while the bread containing alum will be dark purplish. Tbe amount of alum used is about 16 grains to the 4 ℔ loaf.

There is sometimes sulphate of copper in bread. In order to detect it, "cut a smooth slice of bread," says Dr. Parkes, "and draw over it a glass rod dipped in potassium ferrocyanide.' If copper be present, a brick-red color is given by the formation of ferrocyanide of copper."

Potatoes are also used by bakers in making bread. Chemists detect the fact, by testing the ash formed from burning the suspected bread."

Acidity in bread is significant as indicating bad flour from which it is made. Dr. De Chaumont found 6.2, 6.6, and 8.3 grains of acid (reckoned as crystaline oxalic) per ℔, in three specimens of condemned bread.

There is no doubt that a considerable amount of poor bread, some of it adulterated, is supplied to the poorer class of people in this city. The time is coming when a skilled inspector of bread, cake, and confectionery, will be regarded by the public as a necessity for the Health Department. It would be interfering with personal liberty to meddle with the process of making bread in a private family, but the baker, who undertakes to supply the public, should, like the butcher, be under the supervision of the health authority.

SUGAR.

"The amount of sugar in different specimens," says Dr. Edward Smith, "varies from 100 per cent. in pure refined sugar and sugar candy to 94, 88, 60, and 67 per cent. in the first, second, third and fourth classes of unrefined sugar, in accordance with the classification adopted by the Sugar Convention of the different Governments."

Sugar is adulterated with starch, glucose, and grape sugar, which reduce its sweetening quality, without great injury to health. It used to be adulterated with sand, and water, to increase its weight. Some low-grade specimens contain iron. The whiter sugar is the less water it contains. Dr. Parkes gives the following excellent rule for the examination of sugar: "Dissolve in cold water; fragments of cane, starch, sand, gypsum, phosphate of lime are left behind; test with iodine for starch. The best way is to dissolve under the microscope, as all adulterations are at once detected." To test for water, thoroughly dry a pound and weigh again. A solution of copper will reveal excess of glucose. Muriate of tin has recently been used to lighten the color of lower grades of sugar. It is poisonous. Chemists will detect it and separate it from the sugar.

MILK.

"Fraudulent changes in milk are no doubt frequent," says Dr. Edward Smith, "but have been greatly exaggerated, and are now probably much less than they ever were. They consist in the addition of water, the subtraction of cream, and the addition of mineral substances to deepen its opacity, and of animal substances to impart a richness of flavor."

Besides the addition of water and the abstraction of cream, milk is adulterated with starch, dextrin or gum, to conceal the thinness and the blueness; with annato or turmeric, to give color; with chalk, to neutralize acid and give thickness; with carbonate of sodium, to prevent souring; and, very rarely, with emulsions of seeds, to give consistency and conceal bad flavor. Milk is not unfrequently boiled, to preserve it, and then lead, copper, or zinc, if utensils of such material are used, may be dissolved by it and make it poisonous. It is very easy for the chemist to detect all of these foreign substances. Fraud is readily and surely detected by the lactometer.

The milk supply of Milwaukee has already received a great deal of attention from the Health Department during the winter, and will be the subject of a careful report to the Common Council in the near future.

BEER.

The best beer is made exclusively from barley malt and hop extracts. It has been stated that maize and rice are extensively used, as substitutes for barley, in the manufacture of beer. It has not been shown that they contain anything especially deleterious to health. It has also been stated that brewers make extensive use of glucose. There is very strong evidence that glycerine is used to adulterate beer. The current number of the Sanitarium, January 1879, p. 37, contains the following;

> "The *Repertoire De Pharmacie* says that the German Society for the Encouragement of Industry has offered a prize of 2,000 marks for the easiest means of determining within 25 one-hundredths the quantity of glycerine contained in beer. The Union of German brewers will contribute 1,500 marks of this sum, the Union of American brewers 400 marks, and the Society for the Encouragement of Industry the remaining 100 marks. This prize has been offered because it has been satisfactorily proved that glycerine is extensively used in the adulteration of beer. The method employed by M. Pasteur is tedious and troublesome, and a simpler method, whereby the quantity could be accurately and scientifically determined, would serve to bring it into more general use."

The first schedule of the British Licensing Act, (1872) gives the following list of prohibited deleterious ingredients used in the adulteration of beer: "Cocculus indicus, chloride of sodium (otherwise common salt), copperas, opium, Indian hemp, strychnine, tobacco, darnel seed, extract of logwood, salts of zinc or lead, alum, and any other extract or compound of any of the above ingredients." Lord Kimberly, in a speech in the House of Lords (April 17, 1872), spoke of a common adulteration as follows: "A certain amount of beer is drawn from the cask of 84 gallons, and then 6 ℔s of 'foots' (a black coarse sugar), 1½ gallons of 'finings,' (made from skins of soles and other fish), and 12 gallons of water are put in per cask. This beer is ready for sale in two hours, and must be drunk in two days or it goes bad. Salt and copperas are added by some, but the use of copperas is said not to be general. Ale and stout are not mixed with water, but 'finings' are used." Dr. Edward Smith (Foods, p. 413), speaking of the adulteration of beer, says: "It occurs almost exclusively at the retailer's, and has one of the following objects:—1. To increase the quantity; 2. To give intoxicating power; 3. To increase the color and flavor; 4. To create pungency and thirst; and 5. To revive old beer. The first is effected simply by adding water or a weaker beer, and has the effect of lowering the proportion of all the constituents and of lessening the flavor, The second is effected by adding tobacco or the seeds of *Cocculus indicus*; the third, by adding burnt sugar, licquorice or treacle, quassia instead of hops, corriander and carraway seeds; the fourth, by the addition of cayenne pepper or common salt; and the fifth, by shaking stale ale with green vitriol or alum and common salt."

I here add from Dr. Parkes, who is very conservative and holds himself within the prescribed boundaries of authenticated facts and exact science, an enumerated list of adulterations of beer, together with a reliable chemical method of detecting the same.

1. *Water.*—Probably the most frequent adulteration; detected by taste; amount of alcohol and specific gravity of the beer free from alcohol.

2. *Alcohol.*—Seldom added; the quantity of Alcohol is large in proportion to the amount of extract, as determined by the specific gravity after separation of the alcohol.

3. *Sodium or Calcium Carbonate in order to lessen Acidity.*—Neither adulteration can be detected without a chemical examination. Evaporate beer to a thick extract, then put in a retort, acidulate with sulphuric acid, and distil; if calcium or sodium acetate be present, acetic acid in large quantity will pass over. The extract always contains some acetate, but only in small quantity.

Lime.—Evaporate to dryness another portion of beer, incinerate, dissolve in weak acetic acid, and precipitate by ammonium oxalate. In unadulterated beer the precipitate is moderate only.

Excess of Soda, for some always exists in beer, is detected with much greater difficulty, and it will be well not to attempt this.

Mulder states that the presence of too great a quantity of lactates may be determined by boiling the beer with zinc carbonate, when lactate of zinc deposits.

4. *Sodium Chloride.*—This is hardly an adulteration, unless a very large quantity is added. Take a measured quantity of beer; evaporate to dryness; incinerate; dissolve in water, and determine the chlorine by the standard solution of nitrate of silver.

5. *Ferrous Sulphate.*—If the beer be light-colored, a mixture of potassium ferricyanide and ferrocyanide, (Faraday's test), may be added at once, and will give a precipitate of Prussian blue; if the beer be very dark-colored, it must be decolorised by adding solution of lead subacetate and filtering.

Or evaporate a portion of beer to dryness and incinerate; if any iron be present the ash is red; dissolve in weak nitric acid, and test with potassium ferrocyanide. Two grains of ferrous sulphate to nine gallons of water give a red ash (Hassall.) The ash of genuine porter is always white, or grayish white (Hassall.)

6. *Sulphuric Acid* is added to clarify beer, and to give it the hard flavor of age. If the beer be pale, add a few drops of hydrochloric acid, and test with Barium chloride. A *very dense* precipitate may show that sulphuric acid has been added, but it must be remembered that the water used in brewing may contain large quantities of sulphates. (The Burton Spring water is rich in calcium sulphate). If there be a *large* precipitate, then determine the acidity of the beer before and after evaporation; if the amount of fixed acid be found to be *very* large, there will be no doubt that sulphuric acid has been added; or precipitate with Baryta and weigh.

Mulder recommends that the extract of beer be heated, and the sulphurous acid gas which is disingaged led into chlorine water; sulphuric acid will be found in the chlorine water, and may be tested for as usual.

7. *Alum.*—Evaporate to dryness; incinerate, and proceed exactly as in the analysis of alum in bread. The substance added to give "head" to beer is a mixture of alum, salt, and ferrous sulphate.

8. *Burnt Sugar—Essentia bina—Foots.*—Evaporate beer to extract; dissolve in alcohol; evaporate again to extract, and taste. According to Pappenheim, these substances prevent the regressive metamorphosis of the tissues, and thus injure health. Burnt sugar is added to porter to give color, and the addition is not illegal.

9. *Capsicum—Peppers—Grains of Paradise.*—Evaporate to dryness carefully; dissolve in alcohol; filter; evaporate very carefnlly to dryness, and taste if there is any pungency. In fourteen out of twenty samples of illicit beer, Mr. Phillips found that grains of paradise had been added. It is said that the oil of pimenta, zedoary, and ginger are sometimes added.

Aloes.—The taste alone is not reliable. Dr. Koehler proposes to evaporate the beer. Dissolve the residue in nitric acid, when a yellowish-red liquid is obtained, which takes a deep-blood red color when treated with liq. potassæ and glucose, or with liq. potassæ and either cyanide of potassium or sulphide of ammonium, if aloe-resin is present. The nitric acid solution is not decolorized by stannous chloride; if hops only have been used, it is discolorized.

11. *Colocynth.*—The residue of evaporated beer, heated with nitric acid, yields a yellow solution; with concentrated sulphuric acid, an intense red solution; and a cherry-red color is given with Fraehde's test (Molybdate of sodium dissolved in sulphuric acid.)

12. *Colchicin.*—A case is recorded in the *Med. Times and Gazette* (May 16, 1874, p. 29) by Dr. Bottern of Faarborg, in Norway, where colchicin was detected in some English beer, and caused symptoms of poisoning (vomitting, diarrhœa, burning pain in the head, stomach, etc.)

13. *Santonin.*—Evaporate beer to extract; treat with alcohol, filter, evaporate, and prepare the santonin as usual by boiling with lime, and precipitating by an acid.

14. *Cocculus indicus.*—It is not known whether much of this is now used. The witnesses examined some years ago (1856) by the Committee of the House of Commons (Scholefield's) all doubted it; a large quantity of *Cocculus indicus* is, however, annually imported,

and no other use is known.* In two instances out of twenty specimens of adulterated beer, analysed in 1863 by Mr. Phillips, *Cocculus indicus* was found in large quantities.

For the detection of Picrotoxine, Herapath recommends that the beer be first treated with lead acetate; filtered; excess of lead got rid of by sulphuretted hydrogen; fluid evaporated to a small bulk, and mixed with animal charcoal. The charcoal absorbs the picrotoxine; it is boiled in alcohol and the alcohol is evaporated on slips of glass. The picrotoxine crystallises as plumose tufts of circular or oat-shaped crystals.

Dr. Langly, of Michigan, recommends acidulating the beer with hydrochloric acid and agitating with ether; the etherial solution yields on evaporation crystals of picrotoxine.

A plan devised by Depaire is considered by Koehler as one of the easiest and at the same time the best. Mix one litre of beer with finely powdered rock salt; resinous and extractive matters are thrown down. Shake the liquid with ether; an impure picrotoxine is obtained, which can be purified.

None of these processes will give more than 4-10 of the picrotoxine.

When the crystals of picrotoxine are obtained, test them as follows:

(*a*). Rub the crystals with 3 or 4 parts of pure nitrate of potassium; add 1 or 2 drops of strong sulphuric acid. and then an excess of strong solution of soda or potash. A bright reddish-yellow color is given, if picrotoxine be present (Langley).

(*b*). Dissolve the crystals in strong sulphuric acid; a yellow fluid is obtained. Stir it with a glass rod which has been dipped in a concentrated solution of potassium bichromate; a bluish violet color is obtained (like a strychnine reaction), which changes soon into brown, brown green, and at last apple-green.

(*c*). If a good deal of picrotoxine is obtained, dissolve it in water, and put a small fish in the water; the poisonous effects occur in a short time.

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*It is said to be obtainable from wholesale druggists under the name of *multum*.

15. *Strychnine or Nux Vomica.*—This is a very uncommon adulteration, if it ever occur. Add animal charcoal to the beer; digest for twenty-four hours; pour off beer; boil the charcoal in alcohol; filter; evaporate one-half; add a few drops of liquor potassæ and then ether; agitate; pour off ether, and evaporate to dryness; test for strychnine by the color test (sulphuric acid and bichromate of potash, or peroxide of lead, or manganese, or potassium permanganate).*

16. *Tobacco* is occasionally used; in twenty specimens of illicit beer examined in 1863, by Mr. Phillips of the Inland Revenue department, tobacco was found in one.

17. *Picric (Trinitrophenic) Acid.*—Lassaigne recommends the addition of subacetate of lead and animal charcoal; if the beer has still a yellow color, picric acid is present. But, as Mulder and Hassall observe, many beers destitute of picric acid remain yellow. Pohl advises to add white uncombed wool; if picric acid be present it stains it. This is an uncertain test. H. Braumer extracts the picric acid from the wool with hot aqueous ammonia; concentrates to a small bulk, and tests with a drop of solution ot cyanide of potassium. A red coloration of isopurpurate of potassium will be produced if there be one part of picric acid in 500,000 of water (Hassall).

18. *Copper.*—Evaporate a portion of the beer to dryness; incinerate; dissolve in weak nitric acid; test for copper by the insertion of a clean knife; by addition of ammonia and of potassium ferrocyanide.

19. *Lead.*—Evaporate a considerable quantity of the beer to dryness; incinerate; dissolve in weak nitric acid, and test for lead as usual.

WINE.

Space is wanting to give details in regard to the adulterations of wine and the methods of detecting them. The most frequent adulterations are: 1. Water; 2. Distilled spirits; 3. Artificial coloring matters—logwood, blackberries, elderberries, bilberries, etc.;

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*Other vegetable bitters are used, but their detection is difficult and uncertain. Mr. Sarby recommends the spectroscope for detecting calumba root.

4. Lime salts—the so-called "platrage," consisting of sulphate of lime (80 parts,) carbonate of lime (12 parts,) quicklime and sulphide and chloride of calcium (8 parts,) of which mixture 1½ to 7lbs. are added to one hectolitre of wine; 5. Tannin; 6. Alum; 7. Lead; 8. Copper; 9. Cider, perry, etc. Dealers, even "bar-tenders," have books in which receipts are given for making imitations of all kinds of wines.

COFFEE.

The adulterations are chicory, roasted corn, beans, peas, barley, etc., starch of potato, sago, etc., and caramel, or burnt sugar. Chicory itself is adulterated with mangold-wurzel, parsnip, carrot, acorn and even saw-dust. The adulterations are found in ground coffee, which should never be purchased. They are easily detected by the microscope.

TEA.

It is well known that the leaves of green tea are not unfrequently "faced" with Prussian blue, indigo, clay, gypsum, chalk, curcuma, carbonate of copper and acetate of copper. Black lead is sometimes used to give "bloom" to black teas. Copper can be readily detected by solution in an acid and addition of ammonia. Acid will reveal indigo. The microscope will expose the blue particles of indigo and prussian blue on a leaf of tea after it has been a little scraped.

With tea leaves are mixed, for the purpose of adulteration, the leaves of sloe, oak, willow, beech, plane, poplar, chestnut, and hawthorn. In China, the leaves of *Camellia Sasanqua and Chloranthus inconspicuus* are used for adulteration. The tea leaf is distinguished from all other leaves by the peculiar border and primary venation. Dr. F. de Chaumont describes them as follows: "The structure of the serrature is rather peculiar, showing an apparently abortive leaf-bud just within the point. This organ can be seen distinctly with an ordinary pocket lens, and consists of a cylindrical basal portion and a more or less cone-shaped apical part. From the reticulated body of the venation, a distinct little funiculus may be traced into each of the minute bud-like bodies which are situated just *within* the tip of the serrature. This latter particular is of importance, for, as might be expected, somewhat similar appendages may be found in other serrated leaves, but in all cases hitherto examined by us, they occur *at* instead of *within* the point of the serrature. No notice appears to have been taken of this fact by structural botanists; but Dr. MacDonald, who first called attention to it, refers the bodies themselves to the category of marginal buds." A leaf from a specimen of tea may be wet, spread out on a glass slide and covered with a thin glass. Look through it, when, if it be a genuine tea leaf, the peculiar structure will be observed.

"Sometimes," says Dr. Parkes, "exhausted tea leaves are mixed with catechu or with a coarse powder of reddish-brown color, consisting chiefly of powdered catechu, and called 'La Veno Beno.' Gum and starch are added, the leaves being steeped in a strong solution of gum, which, in drying, contracts them. The want of aroma, and the collection at the bottom of the infusion of powdered catechu, or the detection of particles of catechu, will at once indicate this falsification."

The Chinese increase the weight of tea with sand and magnetic oxide of iron. Experts test the quality of tea by the aroma and the physical characters. Only the analytical chemist can find out all there may be in it.

COCOA.

Hassall found that 39 out of 68 specimens contained coloring matter, as umber, and Venetion red. He found that out of 54 specimens, 46 contained starch, and 43 sugar; only 8 were genuine. Arrowroot, sago, sugar, potato starch, other starches, cereal grains, brick-dust and peroxide of iron, are used to adulterate the cocoa of commerce. Dr. Parkes, facetiously says: "Some of the so-called homœopathic cocoas are rightly named, for the amount of cocoa is very small." As the starch-grains of cocoa are peculiar, it is very easy to detect adulterations with the microscope.

VINEGAR.

The chief adulteration is sulphuric acid. Pure vinegar, which contains only acetic acid, is a wholesome article of diet. When with it sulphuric acid is mixed, it has a tendency to form in the body insoluble salts of lime, which are hurtful. Following and condensing Dr. Parkes, the adulterations of vinegar may be enumerated as follows:

1. *Water.*—Take specific gravity; of the best, =1022; of the poorest, =1015. If below this, water has been added.

2. *Sulphuric acid.*—May be determined qualitatively by adding a few drops of the vinegar to a lump of cane sugar, and evaporating on the water-bath. The solution becomes black in proportion to the mineral acid present. If the specific gravity is low, and the acidity high, sulphuric acid is probably present.

3, *Hydrochloric acid.*—Too uncommon to require especial attention.

4. *Common salt.*—May be detected by nitrate of silver and dilute nitric acid.

5. *Pyroligneous acid.*—Distil and re-distil the distilate, the residue will have the smell of acid.

6. *Copper.*—It comes from vessels; evaporate to dryness, incinerate, dissolve in weak nitric acid, divide into two parts, pass sulphurated hydrogen through one, and test for copper in the other by ammonia, or by a piece of iron wire. Copper in the vinegar used for pickles may be detected by inserting the polished blade of a steel knife.

7. *Corrosive sublimate.*—Pass sulphuretted hydrogen through; collect precipitate.

8. *Capsicum, pellitory, or other pungent substances.*—Evaporate nearly to dryness and dissolve in boiling alcohol, evaporate to syrup, taste; burnt sugar gives a bitter taste and dark color to the syrup.

Many other articles are adulterated, but the subject cannot be pursued further at present. It must not be supposed that the poisonous adulterations enumerated here are universal. Some of them are rare. I have purposely omitted two or three articles from the list, for the special reason that they are under investigation by this Department, the results of which will be given as soon as consistent with accurate and thorough work.

XVI. THE METRIC SYSTEM.

As the metric system is frequently referred to in this Report, a table of equivalents is here added for the convenience of readers who are not already familiar with it. Scientists are now using this system in all civilized countries, for the sake of uniformity in the terms and symbols of mensuration. It will gradually be adopted in commerce and education, when it will come into general use. It is now legalized in the Argentine Republic, Austria, Belgium, Brazil, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, and some other countries. It was adopted in France in 1795.

The base of the system is the unit of length, the *metre*=39.37 inches, which was intended to be the one-ten millionth part of a meridional quadrant of the earth. The unit of surface measure, the *are* =116.6 square yards, is the square of ten metres. The unit of capacity, the *litre* =0.908 quart, is the cube of one metre. The unit of weight, the *gram*=15.432 grains, is the weight of that quantity of distilled water at its maximum density which fills the cube of the one-hundredth part of the metre. Multiples and subdivisions of these four units constitute the weights and measures of the metric system. Multiples of the units are made by prefixing the Greek numerals, *deca*, ten; *hecto*, hundred; *kilo*, thousand; and *myria*, ten thousand: thus, the *decametre* is ten metres; the *kilometre*, a thousand metres; and so on. The subdivisions of the units are made by prefixing the Latin decimals, *deci*, tenth; *centi*, hundredth; and *milli*, thousandth: thus, we have *decimetre*, one-tenth of a metre; *centimetre*, one hundredth of a metre; and *millimetre*, one thousandth of a metre.

The reader who has never studied the subject is now prepared to understand the table, with its symbols.

LENGTH.

1 Myriametre	- Mm	(10,000 m)	=6.2137 miles.
1 Kilometre	- Km	(1,000 m)	=0.62137 mile.
1 Hectometre	- Hm	(100 m)	=328.0833 feet.
1 Decametre	- Dm	(10 m)	=393.7 inches.
1 Metre	- m	(1 m)	=39.37 inches.
1 Decimetre	- m	(0.1 m)	=3.937 inches.
1 Centimetre	- cm	(0.01 m)	=0.3937 inch.
1 Millimetre	- mm	(0.001 m)	=0.03937 inch.

SURFACE.

1 Hectare. . .	.Ha	(10,000 sq. m)	=2.471 acres.
1 Are . . .	.a	(100 sq. m)	=119.6 square yards.
1 Centare. . .	.ca	(1 sq. m)	=1.550 square inches.

CAPACITY.

1 Kilolitre or Stere.	Kl or st.	(1000 1.)	=1.308 cubic yards	=264.17 gallons.
1 Hectolitre .	.Hl	(100 1)	=2 bushs.&3.35 p'ks	=26.417 "
1 Decalitre .	.Dl	(10 1.)	=9.08 quarts	=2.6417 "
1 Litre . . .	.l	(1 1.)	=0.908 quart	=1.0567 qts. (1.761 imperial pts.)
1 Decilitre . .	.dl	(0.1 1)	=6.1022 cubic inches	=0.845 gill.
1 Centilitre .	.cl	(0.01 1.	=0.61022 cubic inch	=0.338 fluid ounce.
1 Millilitre .	.ml	(0.001 1.)	=0.061 cubic inch.	=0.27 fluid drachm.

WEIGHT.

1 Millier or Tonneau	M or T	(1,000 Kg)	=1 Kl or 1 Cu m	=2204.6 lbs. (adv.)
1 Quintal .	.Q	(100 Kg)	=1 Hl or 0.1 Cu m	=220.46 "
1 Myriagram .	.Mg	(10 Kg)	=1 Dl or 10 Cu dm	=22.046 "
1 Kilogram .	.Kg	(1,000 g)	=1 l or 1 Cu dm	=2.2046 "
1 Hectogram .	.Hg	(100 g)	=1 dl or 0.1 Cu dm	=3.5274 ounces.
1 Decagram .	.Dg	(10 g)	=1 cl or 10 Cu cm	=0.3527 ounce.
1 Gram .	.g	(1 g)	=1 ml or 1 Cu cm	=15.432 grains.
1 Decigram .	.dg	(0.1 g)	=0.1 ml or 0.1 Cu cm	=1.5432 "
1 Centigram .	.cg	(0.01 g)	=0.01 ml or 10 Cu mm	=0.1543 grain.
1 Milligram .	.mg	(0.001 g)	=0.001 ml or Cu mm	=0.0154 "

One kilogram is equal to a weight represented by one litre of distilled water at 4° C. In the centigrade scale 0 (32° + F.) is the freezing point; 100° + (212° + F.) is the boiling point. Five degrees C. correspond to nine degrees F.

Some of the names in the French system (like our "dime") are not in practical use; *e. g.* hectometre, decagram, etc.

One inch =2.5 centimetres nearly; one quart (wine measure) =0.946 litre; one pound troy =0.373 kilogram; one acre =0.4046 hectare.

XVII. NOMENCLATURE OF THE CAUSES OF DEATH.

The classification of diseases adopted by the International Statistical Congress for the purpose of Public Registration, is here essentially followed. The names of diseases under each class and order are given in alphabetical sequence, according to the Latin titles. The alphabetical arrangement has cost me some labor, but it will greatly facilitate reference. The same arrangement may be adopted in all countries, for the Latin names do not vary with national boundaries. After each Latin title the English equivalent is given in parenthesis. In a second parenthesis is also given the German equivalent. As both English and German newspapers in this city give weekly summaries of mortality, with causes of death, or in other words with the names of diseases, the work of reporters in examining the records of this office for information will thereby be made much easier. Usually the reporters are obliged to struggle through the death-certificates of physicians, lexicon in hand, in order to find the English or German equivalents of the names of diseases given in the technical language of the profession. Hereafter this classification, and English and German parenthetical interpretation, will be adopted by the Health Department for its monthly reports. In most places, it would only be necessary to give the equivalents of the Latin names of diseases in the language of the country. The large percentage of Germans in the population of Milwaukee makes it at least convenient for a great many, to give also the German equivalents.

It is not necessary here to dwell upon the importance of recording vital statistics in a language everywhere understood by the learned. It is also important to translate that language for the people.

Of course, no classification can be regarded as final, for our knowledge of diseases, or of the causes of death, is rapidly advancing. As Liebermeister says (Ziemssen's Cyclopædia, vol. 1 p. 24), "if our classifications still fall short of a rigid system of natural history, they are nevertheless not without value, for they, at least, serve to show clearly the similarities and differences between various diseases. The plans upon which we may classify are very numerous, and we should fail to recognize the present condition of progress, and the aim of such a classification, were we to give one plan unconditional preference over all others. We are willing, in general, to give higher scientific dignity to any basis of classification in proportion as it attaches weight to some essential peculiarity in the excitant of disease; but it will often happen that the immediate object in view will require preference to be given to a nomenclature that has a less scientific value."

ALPHABETICAL CLASSIFICATION.

CLASS I.—ZYMOTIC DISEASES. *Zymotici.*

ORDER 1. MIASMATIC DISEASES—*Miasmatici.*

Anthrax (Carbuncle) (Carbunkel).
Cholera asiaticum (Asiatic cholera).
Cholera infantum.
Cholera morbus.
Cynanche trachealis (Membranous croup) (Croup).
Diarrhœa acuta (Acute diarrhœa) (Durchfall).
Diarrhœa chronica (Chronic diarrhœa).
Dysenteria acuta (Acute dysentery) (Ruhr).
Diphtheria (Diphtheria) (Rachencroup).
Entero-colitis.
Erysipelas (Erysipelas) (Rothlauf).
Erythema (Erythema) (Rothe).
Febris biliosa (Bilious fever) (Gallenfieber).
Febris cerebro-spinalis (Cerebro-spinal fever).
Febris congestiva (Congestive fever).
Febris flava (Yellow fever) (Gelbes fieber).
Febris intermittens (Intermittent fever) (Wechselfieber).
Febris remittens (Remittent fever) (Remittent-fieber).

Febris typhoides (Typhoid fever) (Nervenfieber).
Febris typhus (Typhus fever) (Typhus).
Furunculus (Boil) (Blutgeschwur).
Influenza (Influenza) (Grippe).
Miliaria (Miliaria) (Friesel).
Morbilli (Measles) (Masern).
Parotitis (Mumps) (Ohrdrusenbraune).
Pertussis (Whooping cough) (Keuchhusten).
Pyæmia (Pyæmia).
Scarlatina (Scarlet fever) (Scharlach fieber).
Tonsillitis (Quinsy) (Mandelbraune).
Varicella (Chicken-pox) (Wasser Blattern).
Variola (Small-pox) (Menschen-pocken).
Varioloides (Varioloid).
Other Miasmitic Diseases.

ORDER 2. ENTHETIC OR INNOCULATED DISEASES—*Enthetici.*

Equinia (Glanders) (Rotz).
Gonorrhœa (Gonorrhœa) (Tripper).
Hydrophobia (Hydrophbia) (Wasserscheu).
Morbus ossium syphiliticus.
Necusia (Dissection wound) (Sections gift).
Opthalmia gonorrhoica.
Phagedena gangrænosa (Hospital gangrene).
Pustula maligna (Malignant pustule) (Milzbrandcarbunkel).
Syphilis primaria (Primary syphilis).
Syphilis secundaria (Secondary syphilis).
Syphilis tertiaria (Tertiary syphilis).

ORDER 3. DIETIC DISEASES—*Dietici.*

Alcoholismus (Alcoholism) (Sauferdyskrasie).
Bronchocele (Bronchocele) (Kropf).
Cretinismus (Crentinism).
Delirium alcoholicum (Delirium tremens).
Ebriositas (Drunkenness) (Trunksucht).
Ergotismus (Ergotism) (Mutterkornvergiftung).
Febris a fame (Famine fever) (Hungerfieber).
Purpura (Purpura) (Blutflecken krankheit).
Rachitis (Rickets) (Englische krankheit).
Scorbutus (Scurvy) (Scorbut).

ORDER 4. PARASITIC DISEASES—*Parasitici.*

Aphthæ (Thrush) (Schwæmmchen).
Ascarides (Ascarides).

Hydatides (Hydatids) (Hydatiden).
Porrigo (Scaldhead) (Kopfgrind).
Scabics (Itch) (Kratze).
Tænia solum (Tape-worm) (Bandwurm).
Trichinosis (Trichinosis).
Vermes (Worms) (Wurmsuch).
Other Parasitic Diseases.

CLASS II.—CONSTITUTIONAL DISEASES. *Cachectici.*

OPDER I. DIATHETIC DISEASES—*Diathetici.*

Anæmia (Anæmia) (Blutarmuth).
Anasarca (General dropsy*) (Wassersucht).
Arthritis (Articular rheumatism).
Asthma (Spasmodic asthma) (Engbrustigkeit).
Carcinoma (Cancer†) (Krebs).
Gangræna senilis (Dry gangrere) (Trockner brand).
Hydrops (Dropsy‡) (Wassersucht).
Leucocythæmia.
Mortificatio (Mortification).
Noma (Cancrum oris).
Podagra (Gout) (Gicht).
Podagra rheumatica (Rheumatic gout).
Rheumatismus (Rheumatism).
Ulcus ex cubando (Bedsore).

ORDER 2. TUBERCULAR DISEASES—*Phthisici.*

Abscessus psoasus (Psoas Abscess) Lendenmuskelabscess).
Hæmoptysis (Spitting blood) (Blutspeien).
Hydrocephalus.
Meningitis tuberculosis (Tubercular meningitis).
Morbus coxarius (Hip disease).
Peritonitis tuberculosis (Tubercular peritonitis).
Pithisis pulmonalis (Consumption) (Schwindsuch).
Scrofula (Scrofula) (Scrophlen).
Tabes mesenterica (Marasmus) (Tuberculose Bauchfellentzungdung).
Other Tubercular Diseases.

CLASS III.—LOCAL DISEASES *Monorganici.*

ORDER I. DISEASES OF THE NERVOUS SYSTEM—*Cephalici.*

Apoplexia (Apoplexy) (Schlagfluss).
Atropia musculorum ingravicens (Progressive Locomotor Ataxia).

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*State cause.

†State the kind of cancer, as colloid, osteoid, encephaloid, schirrus, etc., and in what part of body located.

‡State cause, and what part of body affected.

Chorea (St. Vitus' dance) (Veitstanz).
Convulsio (Convulsions)* (Krampte).
Eceephalitis (Inflamation of the brain) (Gehirnentzundung).
Epilepsia (Epilepsy) (Fallsucht).
Hemiplegia (Paralysis of one side of the body).
Hydrocephalus acutus (Acute hydrocephalus) (Acuter Wasserkopf).
Hysteria (Hysteria) (Muttersucht).
Insania (Insanity).†
Insolatio (Sunstroke) (Sonnenstich).
Larygismus stridulus (False Croup).
Meningitis.‡
Myelitis (Inflamation of spinal cord) (Ruckenmarktenzumdung).
Mecrencephalus (Softening of brain).
Paralysis (Palsy) (Lahmung).
Paralysis agitans (Shaking palsy).
Paraplegia (Palsy of lower extremities).
Tetanns (Lockjaw§) (Starrkrampf).
Trismus nascentium.||
Other Diseases of the Nervous System.

ORDER 2. DISEASES OF THE CIRCULATORY SYSTEM—*Cardiaci.*

Aneurisma (Aneurism).¶
Angina pectoris (Breast pang) (Brustbraune).
Arteritis (Inflammation of arteries) (Schlagaderentzundung).
Atheroma arteriarum (Calcification of artery).**
Atrophia cordis (Atrophy of heart).
Carditis (Inflammation of Heart) (Hertzenzundung).
Degeneratio cordis (Fatty degeneration of heart) (Fettige herzentartung).
Embolismus (Embolism).
Endocarditis (Inflammation of membrane lining heart).
Epistaxis (Nosebleed).
Hydrops pericardii (Dropsy of heart).
Hypertrophia cordis (Enlargement of heart).
Morbus valvularum cordis (Valvular disease of heart).
Pericarditis (Inflammation of membrane covering heart) (Hertzbeutelentzundung).

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*State Cause.

†State whether Dementia, Mania, Melancholia, or Monomania.

‡State whether Cerebral, Spinal, or Cerebro-spinal.

§State cause.

||State cause of nervous maladies when known.

¶State what artery and whether surgical operation.

**State cause and what artery or arteries.

Phlebitis (Inflammation of viens) (Venenentzundung).
Syncope (Fainting) (Ohnmacht).
Varices (Varicose veins) (Krampfadern).

ORDER 3. DISEASES OF THE RESPIRATORY SYSTEM—*Pneumonici.*

Apoplexia pulmonalis (Congestion of Lungs) (Lungenschlag).
Bronchitis (Bronchitis) (Luftrohrentzundung).
Diaphragmitis (Inflammation of Diaphragm).
Emphysema.
Empyema.
Gangræna pulmonum (Gangrene of Lungs).
Hydrothorax (Dropsy of chest) (Brustwassersucht).
Laryngitis (Inflammation of Larynx) (Kehlkopfentzundung).
Œdema glotidis (—) (Stimmenentzundung).
Pleuritis (Pleurisy) (Brustfellentzundung).
Pleuro-Pneumonia (Pleurisy and inflammation of lungs).
Pneumonia (Inflammation of Lung) (Lungenentzundung).
Pneumothorax (—) (Luftbrust).
Other diseases of respiratory system.

ORDER 4. DISEASES OF THE DIGESTIVE SYSTEM—*Enterici.*

Ascites (Abdominal Dropsy) (Bauchwassersucht).
Chololithus (Gallstones) (Gallensteine).
Cirrhosis (—) (Granulirte Leber).
Colico (Colic) (Kolik).
Duodenitis.
Dyspepsia (Indigestion) (Dyspepsie).
Entiritis (Inflammation of bowels) (Darmentzundung).
Fistula in Ano (Fistula)* (Fistel).
Gastritis (Inflammation of stomach) (Magenentzundung).
Glossitis (Inflammation of tongue) (Zungentzundung).
Hæmatemesis (Blood-vomit) (Blutbrechen).
Hæmorrhois (Piles) (Hamorrhoiden).
Hepatitis (Inflammation of liver) (Entzundung der Leber).
Hernia (Rupture†) (Emgeweiderbruche).
Icterus (Jaundice) (Gelbsucht).
Ileus (Ileus) (Darmgicht).
Intus-susceptio (Invagination of gut) (Darmverschlingung).
Melæna (—) (Schwarze krankheit).
Obstipatio (Constipation) (Verstopfung).

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*Give location and nature of the fistula.

†State whether congenital, femoral, omental, inguinal, umbilical or ventral, also, whether operation was performed.

Œsophagitis (Inflammation of gullet) (Speiserohrenentzundung).
Perforatio intestinorum (Perforation of intestine).
Peritonitis (Inflammation of abdomen) (Bauchfellentzundung).
Pharyngitis (Quinsy) (Schlundentzundung).
Splenitis (Inflammation of spleen) (Entzundung der milz).
Stomatitis (Inflammation ol mouth) (Mundentzundung).
Strictura intestini (Stricture of intestine*).
Typhlitis.
Ulceratio intestinorum (Ulceration of intestine).
Ulcus stomachi (Ulcer of stomach†).

Other Diseases of the Digestive System.

ORDER 5. DISEASES OF THE URINARY SYSTEM—*Nephritici.*

Calculus (Stone‡) (Steinkrankheit).
Cystitis (Inflammation of bladder) (Blasenentzundung).
Diabetes (—) (Harnruhr).
Hæmaturia (Bloody urine) (Blutharnen).
Ischuria (Retention of urine) (Harnverhaltung).
Lithiasis (Gravel) (Harngries).
Morbus prostaticus (Diseased prostate) (Vorsteherdrusenkrankheit).
Nephria (Bright's disease) (Bright'sche krankheit).
Nephritis (Inflammation of kidneys) (Nierenentzundung).
Strictura urethræ (Structure of urethra§).

Other diseases of the Urinary System.

ORDER 6. DISEASES OF THE GENERATIVE SYSTEM—*Gennetici.*

Hydrocele (Dropsy of testicle) (Wasserbruch).
Hydrops ovarii (Ovarian dropsy) (Eierstockswassersucht).
Metritis (Inflammation of womb) (Gebarmutterentzundung).
Morbus uteri (Uterine disease¶).
Polypus uteri (Uterine polypus) (Uteruspolypen).
Tumor ovarii (Ovarian tumor||) (Eierstocksgeschwulste).
Tumor uteri (Uterine tumor) (Uterusgeschwulste).
Varicocele (Varicocele).

Other Diseases of the Generative System.

***State whether from adhesions, bands, or schirrhus.**

†State whether perforation has taken place.

‡State whether surgical operation was performed.

§Not a consequence of Gonorrhœa.

¶State the kind of disease.

||State whether surgical operation was performed.

ORDER 7. DISEASES OF THE LOCOMOTIVE SYSTEM—*Myostici.*

Arthritis (Inflammation of joints) (Gliedersuch).
Atropia musculorum (Muscular Atrophy) (Muskelatrophie).
Caries (—) (Ruckgrathverkrummung).
Exostitis (Tumor of bones).
Mollites ossium (Softening of the bones).
Morbus Articulorum (Joint Disease).*
Necrosis (—) (Knochenfrass).
Osteo-Myelitis.
Ostitis (Inflammation of bones)† (Knochenentzundung).
Periostitis.
Synovitis (—) Gelenkkapselentzundung).

ORDER 8, DISEASES OF THE INTEGUMENTARY SYSTEM—*Chrotici.*

Abcessus (Abscess) (Geschwur).
Eczema (—) (Hitzblaschen).
Ecthyma.
Pemphigus (—) (Blasenausschlagg).
Phlegmon.
Rupia.
Paronychia (Whitlow) (Wurm).

CLASS IV. DEVELOPMENTAL DISEASES. *Metamorphici.*

ORDER I. DEVELOPMENTAL DISEASES OF CHILDREN—*Paidici.*

Amentia ingenita (Idiocy) (Idiotismus).
Anus imperforatus (Imperforate anus) (Atresia Ani).
Atlectasis pulmonum (—) (Lungen-atelektasie).
Cyanosis.
Dentitio (Teething‡) (Zahnung).
Hæmorrhagia umbilicalis (Umbilical hemorrhage).
Natus Præter naturam (Preternatural birth§).
Palatum fissum (Cleft palate).
Partus emortuus (Still-birth‖) (Todgeboren).
Partus intempestivus (Premature birth) (Unzeitiggenboren).
Sclerema.
Spina bifida.

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*State what joints are especially affected.
†In all diseases of the bones, state which bones are affected.
‡State whether accompanied with convulsions, paralysis, etc.
§State in what respect.
‖State as near as may be the period of utero-gestation.

ORDER 2. DEVELOPMENTAL DISEASES OF WOMEN—*Gyniaci.*

Abortus (Abortion, miscarriage) (Fehlgeburt).
Chlorosis (—) (Bleichsuch).
Climacteria (Turn of life).
Eclampsia parturi (Convulsions in childbirth).
Febris puerperalis (Puerperal fever).
Graviditas extra uterina (Extra uterine fœtation).
Hæmorrhagia post partum (Flooding).
Mania puerpuralis (Puerperal mania).
Partus (Childbirth) (Kindbett).
Pelvis deformis (Deformed pelvis).
Phlegmasia dolens (Milk leg).
Placenta previa.

ORDER 3. DEVELOPMENTAL DISEASES OF OLD PEOPLE—*Geratici.*

Gangræna senilis (Senile gangrene).
Senectus (Old age) (Altersschwache).
— (Senile debility).

ORDER 4. DISEASES OF NUTRITION—*Trophici.*

Atrophia (Atrophy) (Atrophie).
Debilitas (Debility).
Degeneratio (Degeneration*.)

CLASS V.—VIOLENCE TENDING TO SUDDEN DEATH. *Thanatici.*

ORDER I. ACCIDENT AND NEGLIGENCE.

Ambusta (Burns and scalds) (Feuer).
Amputatio (Amputation).
Concussio (Concussion of—).
Contusio (Contusion of—).
Explosio (Explosion of—).
Fractura (Fracture)† (Bruch).
Gelatio (Freezing) (Erfrierung).
Ictus fulminis (Lightning) (Blitzschlag).
Morsus serpentis (Snake-bite) (Schlangenbiss).
Suffocatio (Suffocation) (Enstickung).
Submersio (Drowning) (Ertrinken).
Venenatio (Poisoning by—)‡ (gift).
Vulnera (Wounds)§ (Wunden).

Other causes of violent death.

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*State whether amyloid, fatty, mineral or pigmental.
†State fracture of what, and how caused.
‡State what poison.
§State whether gunshot, incised, penetrating,—cut, stab, etc, and with what instrument.

ORDER 2.* DEATHS IN BATTLE—*Polemici.*

ORDER 3. HOMICIDE—*Androphonici.*

Murder and Manslaughter.†

ORDER 4. SUICIDE—*Autophonici.*

Submersio (Drowning) (Ertrinken).
Suspendium (Hanging (Erhangen).
Venenatio (poisoning by—)‡ (Gift).
Vulnera (Wounds)§ (Wunden).

ORDER 5. EXECUTION—*Demiotici.*

Suspendium (Hanging) (Erhangen).

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*This order is omitted in civil registration.
†State means or instrument.
‡State kind of poison.
§State kind of wound and instrument used.

XVIII. DETAILED FINANCIAL STATEMENT.

I give here all the items of the expenditures made by this Department during the year 1878. The people have a right to know for what their money, collected in taxes, is expended. My predecessor is responsible for all expenditures made previous to the 29th of April, 1878, when I took charge of the Department. I am responsible for all made since that date.

I. EXPENDITURES.

		Salaries for December, 1877	$ 266 65
Jan.	8.	J. S. White, postage stamps	10 00
	28.	Ed. Keogh, printing blanks	9 50
		" " postal cards	4 50
		Richard Holtz, fixing water pipe	1 25
		G. Korn, cash advances	5 48
		Geo. Wright & Bros., Vaccine matter	34 00
		Van Eweyk & Schmidt, office sign	1 50
		E. W. Diercks, cash advances	24.75
	31.	Salaries for January	266 66
Feb.	4.	I. H. Stearns, cash advances	12 05
	7.	J. S. White, postage stamps	10 00
	11.	John Dolge, disinfecting	25 00
		West & Co., copying paper	1 00
		W. E. Goodman, repairs	1 00
		Aug. Gerber, services as messenger	1 00
		R. Pettit, distributing circulars	5 00
		Otto A. Thiele, disinfectants	6 15
		Frank W. Cutler, disinfectants	4 78
		R. Martin, cash advances	4 50
		Wisconsin Publishing Co., advertising	0 78

		West & Co., stationery		$ 1 75
		I. H. Stearns, subscriptions		14 25
		F. W. Cutler, fumigators		2 00
		G. Korn, cash advances		4 37
		I. H. Stearns, do		33 20
		John Dolge, disinfecting		35 00
Feb.	28.	Salaries for February		266 65
Mar.	4.	John Reichart, rent for Grief family		5 00
		Milwaukee Hospital, transferring patients		18 00
	18.	F. W. Cutler, 4 doz packages of disinfecting material		2 00
		Gallun & Bro., hardware		2 10
		Am. Oleograph Co., vaccine vesicle plates		42 50
		Ed. Keogh, printing ordinances, etc		11 00
		Des Forges & Co., stationery		4 50
		J. S. White, postage stamps		20 00
	25.	R. Martin, office rent, May 1 to Dec. 1		24 00
		G. Korn, horse car fare		3 00
		Bray Bros., printing 1000 copies Annual Reports		328 47
April	1.	Salaries for March		266 65
	8.	Ed. Keogh, printing blanks		13 50
	15.	Germania Co., printing ordinance		1 50
		Sentinel Co., printing notices		10 00
		Wm. Harper, 2 panes of glass in window		1 20
		I. H. Stearns, cash advances		6 00
		R. Martin, medicine for dispensary		5 00
		E. W. Diercks, cash advances		7 20
		F. W. Cutler, 4 doz packages of disinfecting material		2 00
		Geo. Wright & Bros., vaccine matter		39 00
	29.	John Dolge, disinfecting		45 00
		Salaries to April 15		133 32
		Ed. Keogh, monthly report for March		8 00
		Des Forges & Co., stationery		10 10
		Salary of I. H. Stearns, to April 29		38 88
		Salary of E. W. Diercks, to May 5		33 32
May	18.	Postage stamps		5 00
	20.	Geo. Wright & Bro., vaccine matter		1 00
		E. L. Griffin, vaccine matter		7 50
	31.	Salaries for May, as follows:		
		E. W. Tallmadge, 26 days	$ 34 94	
		A. F. Kalckhoff, 26 days	34 94	
		E. H. G. Meacham, 26 days	34 94	
		E. W. Diercks, 26 days	55 91	160 73

June	3.	C. H. Clark, changing stamp $	3	75
		R. Martin, salary April 16 to May 1	33	33
		G. Korn, horse car fare to April 15	4	00
		John Dolge, disinfecting	8	00
		Milwaukee Hospital, care of small-pox patient	9	00
		Dr. N. Senn, attending small-pox patient at hospital	10	00
		E. L. Griffin, vaccine points	7	50
		G. L. Lyon, repairing sink		75
		Ed. Keogh, printing blanks	28	50
	7.	J. S. White, postage stamps	5	00
		O. W. Wight, salary from April 30 to May 31	172	21
		Des Forges & Co., stationery	9	19
		J. S. White, postal cards	5	00
		I. H. Stearns, salary April 16 to 30	38	90
	10.	Ed. Keogh, printing blanks	21	00
	30.	Salaries for June	358	30
July	1.	Milwaukee News Co., advertising	4	95
		Schmidt & Meyer, map of city sewerage	4	00
		Wm. Hogg, city directory	4	00
	8.	Des Forges & Co., stationery	11	77
	20.	J. S. White, postage stamps	3	00
	22.	G. Korn, salary April 16 to May 1	33	33
		Des Forges & Co., binders' board for filing records	14	40
		E. W. Diercks, cash advances for stamp, paper, etc	4	30
	29.	John Dolge, disinfecting	45	00
		R. Martin, horse car fare to April 30	4	50
		M. C. Miller, livery June 10 and 13	6	50
		Milwaukee News Co., printing 25,000 circulars	25	00
		Salaries for July	358	30
Sept.	1.	Salaries for August	358	30
		Salary of Geo. Koeppel, July 29 to Aug. 31	54	83
		Des Forges & Co., stationery	14	30
		Bromberg & Shrank, cleaning offices	15	00
	16.	Jac Mueller, whitewashing offices	6	00
		Des Forges & Co., stationery	10	55
		J. S. White, postage stamps	10	00
		Geo. Koeppel, services July 22 to 29	11	50
		Salaries for September	408	30
Oct.	7.	Des Forges & Co., stationery	4	20
	14.	Ed. Keogh, printing 30,000 circulars	30	00
	21.	Do do blanks	10	34
		Van Borke & Co., large city map	7	00

		F. Gallun & Bros., stove and fixtures	$ 46 30
		W. E. Goodman, repairing gas fixtures	1 65
		E. W. Diercks, cash advances for office stamp, blanks, etc.	13 50
		O. W. Wight, cash advanced for translating	6 00
	31.	Salaries for October	408 30
Nov.	2.	J. S. White, postal cards	5 00
		Ed. Keogh, printing blanks	6 00
		A. W. Phelps, 6 tons of coal	35 70
	25.	Des Forges & Co., stationery	9 44
		Mueller & Niedermann, stove and fixtures	50 85
		Ed. Keogh, printing blanks	6 00
	30.	Salaries for November	408 30
Dec.	16.	Banner & Volksfreund Co., printing circulars	7 00
		Dr. N. Senn, treating small-pox patient at hospital	10 00
		W. H. Munn & Co., 3 spittoons	2 40
		John Dolge, disinfecting	20 00
		Stark Bros., matting for office	28 13
		Des Forges & Co., stationery	12 20
		J. S. White, postage stamps	8 50
			$5567 30

RECAPITULATION.

Expenditures for first 4 months	$ 2134 00
" " " last 8 "	3433 30
Total for year 1878	$5567 30

II. CREDIT.

Balance on hand Dec. 31, 1877	$ 1973 28	
Appropriation for 1878	10000 00	
Collection from U. S. government, for care of small-pox patients from Marine Hospital	102 00	
	$12075 28	
Balance Dec. 31, 1878		$6507 98

MORTUARY AND METEOROLOGICAL TABLES.—SUMMARY OF NUISANCES, ETC.

"The fact that, in modern times, the subject of hygiene generally, and State Medicine in particular, has commenced to attract so much the public attention, is undoubtedly owing to the application of statistics to public health. It is impossible for any nation, or for any Government, to remain indifferent when, in figures which admit of no denial, the national amount of health and happiness, or disease and suffering, is determined."—DR. PARKES.

MORTUARY AND METEOROLOGICAL TABLES.—SUMMARY OF NUISANCES, ETC.

It was my intention to have translated the Mortuary Tables for 1878, into the form required by the change of Nomenclature of causes of Death, set forth in another part of this Report, and henceforth to be adopted, but in the great pressure of official work, time has been wanting. The old form has therefore been followed. As the new form has been especially designed for local use in a mixed English and German population, and as the old form is sufficiently clear for general statistical purposes, this is the less to be regretted.

In the meteorological tables no changes of form have been made. These tables are in conformity with the plan generally adopted at the Signal Offices of the Federal Government.

Following the mortuary and meteorological tables, the work of this office is pretty fully shown in an alphabetical list of nuisances abated, yards of ordure and loads of garbage removed from the city, the number and location of lots covered with stagnant water reported to the Common Council and Board of Works, the various inspections, the prosecutions undertaken, the orders issued, the amount of confiscations of unwholesome meat, the visitations of cases of contagious and infectious diseases, the notifications sent to schools, etc., etc.

MONTHLY REPORT OF DEATHS

FOR

JANUARY 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Croup	3
Diarrhœa	2
Diphtheria	4
Erysipelas	1
Fever—Scarlet	6
Fever—Typhoid	1
Fever—Typhus	1
Small Pox	7

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic*

Cancer	1
Cancer—Stomach	1
Gout	1

ORDER 2—*Tubercular.*

Consumption	13

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	2
Congestion of Brain	2
Convulsions—Infantile	23
Inflammation of Brain	1
Meningitis	4
Tetanus	1
Trismus Nascentium	1

ORDER 2.—*Circulatory.*

Dropsy General	2
Endocarditis	1
Heart Clot	1
Paralysis of Heart	2
Pericarditis	1
Valvular Disease of Heart	5

ORDER 3.—*Respiratory.*

Congestion of Lungs	1
Hæmoptysis	1
Laryngitis	1
Œdema—Lungs	1
Pneumonia	5

ORDER 4.—*Digestive.*

Entiritis	1
Congestion of Liver	1
Hepatitis	1

ORDER 5.—*Urinary.*

Cystitis	1
Uræmia	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1.—*Children.*

Cyanosis	1
Debility—Infantile	3
Dentition	2

ORDER 2.—*Women.*

Hœmorrage, womb	1
Puerperal Peritonitis	1
Tedious Labor	1

ORDER 3.—*Old Age.*

Debility—Senile	6
Gangrene—Senile	2

CLASS V.

VIOLENCE.

ORDER 1.—*Accident.*

Drowned	1
Shock from R. R. Accident	2
Wound—Lacerated	1
Wound—by fall	1

ORDER 3.—*Suicide.*

Hanging	3
Total Deaths	126

Stillborn	17
Premature Birth	2
Total	19

SEX.

Adults—Male	31	Total Females	59
Adults—Female	27	Total Adults	58
Minors—Male	36	Total Minors	68
Minors—Female	32		
Total Males	67	Grand Total	126

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	221	Corresponding month in 1875	145
Corresponding month in 1876	120		

JANUARY—*Continued.*

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males, under 1 year	14	....	....	14	Females, under 1 year	17	....	....	17
" from 1 to 5	12	....	....	12	" from 1 to 5	3	....	....	3
" from 5 to 20	10	....	....	10	" from 5 to 20	10	2	....	12
" from 20 to 30	1	2	....	3	" from 20 to 30	3	1	....	4
" ftom 30 to 40	....	5	1	6	" from 30 to 40	1	6	....	7
" from 40 to 50	....	4	....	4	" from 40 to 50	1	....	....	1
" from 50 to 60	1	8	....	9	" from 50 to 60	....	3	....	3
" from 60 to 70	....	3	....	3	" from 60 to 70	3	2	1	6
" from 70 to 80	1	4	....	5	" from 70 to 80	....	4	....	4
" over 80 years	....	1	....	1	" over 80 years	....	2	....	2
Total—Males	39	27	1	67	Total Females	38	20	1	59
					Grand Total	....	....	....	126

NATIVITIES.

Wisconsin	55
Other States	21
Germany	34
Ireland	5
England	2
Scotland	..
Wales	..
Canada	..
France	..
Russia	..
Poland	..
Switzerland	1
Bohemia	1
Hungary	..
Holland	2
Norway	1
Sweden	1
Denmark	..
Austria	1
Netherlands	1
Elsewhere	1
Italy	..
Total	126

CEMETERIES WHERE INTERRED

Almshouse Farm	1
Calvary	22
Forest Home	30
Greenwood	3
National Home	..
Spring Hill	1
Trinity	9
Union	58
Elsewhere	2
Total	126

LOCALITIES.

First Ward	6
Second Ward	18
Third Ward	7
Fourth Ward	10
Fifth Ward	7
Sixth Ward	17
Seventh Ward	6
Eighth Ward	8
Ninth Ward	12
Tenth Ward	15
Eleventh Ward	9
Twelfth Ward	3
Thirteenth Ward	4
Orphan Asylum (1st W'd)	1
St. Mary's Hospital (1st Ward)	..
Milwaukee Hospital (2d Ward)	3
Asylum Little Sisters Poor (4th Ward)	..
St. Vincent's Infant Asylum (5th Ward)	..
House of Correction (11th Ward)	..
Total	126

DAILY MORTALITY.

1st	6
2d	3
3d	6
4th	4
5th	6
6th	2
7th	1
8th	4
9th	5
10th	2
11th	1
12th	1
13th	4
14th	4
15th	4
16th	4
17th	5
18th	5
19th	4
20th	5
21st	2
22d	6
23d	8
24th	5
25th	4
26th	8
27th	5
28th	2
29th	3
30th	4
31st	3
Total	126

MONTHTY REPORT OF DEATHS

FOR

JUNE 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Croup	3
Diarrhœa	1
Diphtheria	4
Fever -Bilious	1
" Typhoid	3
" Typhus	1
Pyæmia	1
Small Pox	1

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Cancer	1
Cancer—Intestines	1
" Stomach	1
" Womb	2
Marasmus	4

ORDER 2—*Tubercular.*

Consumption	12
Tabes Mesentirica	1
Ill defined	2

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	1
Apoplexy—Cerebral	1
Convulsions—Infantile	14
Meningitis	6

ORDER 2—*Circulatory.*

Angina Pectoris	1
Dropsy General	3
Endocarditis	1
Paralysis of Heart	1
Valvular Disease of Heart	4

ORDER 3—*Respiratory.*

Bronchitis	4
Congestion of Lungs	2
Œdema—Lungs	2
Pleuritis	1
Pneumonia	2

ORDER 4—*Digestive.*

Enteritis	1
Gastritis	1
Hepatitis	2
Intussusception	1

ORDER 6—*Generative.*

Ovarian Tumor	1

ORDER 8.—*Locomotory, Integumentary.*

Pemphigus	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Congenital Debility	4
Icterus Neonatorum	1

ORDER 3—*Old Age.*

Debility—Senile	3
Gangrene—Senile	1

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Drowned	2
Killed by Lightning	1
Wound—by fall	1

ORDER 2—*Homicide.*

Murdered	1

ORDER 3—*Suibide.*

Gunshot	2
Poisoning	1
Total Deaths	106

Stillborn	13
Premature Birth	4
Total	17

SEX.

Adults—Male	24
Adults—Female	24
Minors—Male	39
Minors..Female	19
Total Males	63
Total Females	43
Total Adults	48
Total Minors	58
Grand Total	106

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	159
" " " 1876	145
Corresponding month in 1875	106

JUNE—*Continued.*

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males, under 1 year	19	....	....	19	Females. under 1 year	12	....	....	12
" from 1 to 5	9	....	....	9	" from 1 to 5	2	....	....	2
" from 5 to 20	11	....	..	11	" from 5 to 20	5	....	....	5
" from 20 to 30	6	....	....	6	" from 20 to 30	....	3	....	3
" from 30 to 40	1	1	....	2	" from 30 to 40	1	3	....	4
" from 40 to 50	1	6	....	7	" from 40 to 50	....	2	....	2
" from 50 to 60	....	2	....	2	" from 50 to 60	....	6	1	7
" from 60 to 70	....	3	....	3	" from 60 to 70	....	4	1	5
" from 70 to 80	....	3	....	3	" from 70 to 80	....	1	1	2
" over 80 years	....	....	1	1	" over 80 years	....	....	1	1
Total—Males	47	15	1	63	Total—Females	20	19	4	43
	....	....	....	....	Grand Total	....	....	....	106

NATIVITIES.

Wisconsin	57	France	..	Sweden	..
Other States	8	Russia	..	Denmark	..
Germany	32	Poland	3	Austria	..
Ireland	2	Switzerland	..	Netherlands	..
England	2	Bohemia	..	Elsewhere	..
Scotland	..	Hungary	..	Italy	..
Wales	..	Holland	2		
Canada	..	Norway	..	Total	106

CEMETERIES WHERE INTERRED.

Almshouse Farm	2	National Home	..	Elsewhere	3
Calvary	24	Spring Hill	1		
Forest Home	26	Trinity	11	Total	106
Greenwood	..	Union	39		

LOCALITIES.

First Ward	12	Tenth Ward	12	Asylum Little Sisters Poor (4th Ward)	..
Second Ward	14	Eleventh Ward	8	St. Vincent's Infant Asylum (5th Ward)	4
Third Ward	8	Twelfth Ward	4	House of Correction (11th Ward)	1
Fourth Ward	7	Thirteenth Ward	..		
Fifth Ward	8	Orphan Asylum (1st W'd)	..	Total	106
Sixth Ward	7	St. Mary's Hospital (1st Ward)	1		
Seventh Ward	2	Milwaukee Hospital (2d Ward)	2		
Eighth Ward	7				
Ninth Ward	9				

DAILY MORTALITY.

1st	4	12th	2	23d	3
2d	8	13th	3	24th	3
3d	4	14th	3	25th	7
4th	1	15th	3	26th	5
5th	1	16th	3	27th	1
6th	7	17th	2	28th	6
7th	5	18th	3	29th	1
8th	2	19th	4	30th	1
9th	2	20th	6		
10th	7	21st	3	Total	106
11th	1	22d	5		

MONTHLY REPORT OF DEATHS

FOR

JULY 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Cholera—Infantum	6
Croup	3
Diarrhœa	4
Dysentery	2
Diphtheria	4
Fever—Scarlet	3
Small Pox	1

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Marasmus	6
Scrofula	1

ORDER 2—*Tubercular.*

Consumption	13
Hydrocephalus	3
Scrofula	1
Tubercular Bronchitis	2
Tuberrular Enteritis	2
Tubercular Peritonitis	1
Ill Defined	1

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	2
Apoplexy—Cerebral	5
Apoplexy—Pulmononary	4
Congestion of Brain	3
Convulsions—Infantile	27
Chorea	1
Epilepsy	1
Inflammation of Brain	1
Meningitis	5
Sun Stroke	12
Tetanus	1

ORDER 2—*Circulatory.*

Dropsy General	1
Paralysis of Heart	2
Valvular Disease of Heart	4

ORDER 3—*Respiratory.*

Bronchitis	6
Congestion of Lungs	1
Laryngitis	1
Œdema—Glottidis	1
Pneumonia	3

ORDER 4—*Digestive.*

Enteritis,	2
Gastro-Enteritis	1
Gastritis	1
Peritonitis	3
Cirhossis of Liver	1

ORDER 5—*Urinary.*

Nephritis	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Debility—Infantile	9

ORDER 2—*Women.*

Puerperal Convulsions	3
Puerperal Metritis	1

ORDER 3—*Old Age.*

Debility—Senile	5

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Drowned	5
Shock from R. R. Accid't	2
Wound—Lacerated	1

ORDER 3.—*Suicide.*

Poisoning	1
Total Deaths	170

Stillborn	13
Premature Birth	1
Total	14

SEX.

Adults—Male	44	Total Females	76
Adults—Female	28	Total Adults	72
Minors—Male	50	Total Minors	98
Minors—Female	48		
Total Males	94	Grand Total	170

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	226	Corresponding month in 1875	149
Corresponding month in 1876	198		

JULY—*Continued.*

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males, under 1 year	37	....	....	37	Females, under 1 year	19	....	....	19
" from 1 to 5	6	....	....	6	" from 1 to 5	15	...	....	15
" from 5 to 20	7	....	....	7	" from 5 to 20	14	2	....	16
" from 20 to 30	4	3	....	7	" from 20 to 30	3	6	....	9
" from 30 to 40	4	12	....	15	" from 30 to 40	....	6	....	6
" from 40 to 50	3	5	....	8	" from 40 to 50	....	3	3	6
" from 50 to 60	....	2	1	3	" from 50 to 60	....	1	....	1
" from 60 to 70	2	5	2	9	" from 60 to 70	....	1	1	2
" from 70 to 80	...	....	1	....	" from 70 to 80	1	1	....	2
" over 80 years	1	....	....	1	" over 80 years	....	....	....	....
Total—Males	63	27	4	94	Total—Females	52	20	4	76
	....	....	....	....	Grand Total			....	170

NATIVITIES.

Wisconsin	99	France	..	Sweden	..
Other States	5	Russia	..	Denmark	..
Germany	50	Poland	..	Austria	1
Ireland	6	Switzerland	..	Netherlands	..
England	3	Bohemia	..	Not given	1
Scotland	..	Hungary	..	Italy	..
Wales	..	Holland	1		
Canada	1	Norway	3	Total	170

CEMETERIES WHERE INTERRED.

Almshouse Farm	2	National Home	..	Elsewhere	14
Calvary	40	Spring Hill	2		
Forest Home	48	Trinity	8	Total	170
Greenwood	..	Union	56		

LOCALITIES.

First Ward	12	Tenth Ward	11	Asylum Little Sisters Poor (4th Ward)	..
Second Ward	26	Eleventh Ward	19	St. Vincent's Infant Asylum (5th Ward)	1
Third Ward	12	Twelfth Ward	7	Convent of Capuchins (6th Ward)	1
Fourth Ward	13	Thirteenth Ward	5	Total	170
Fifth Ward	10	St. Mary's Inst. (1st W'd)	..		
Sixth Ward	13	St Mary's Hospital (1st W'd)	3		
Seventh Ward	13	Milwaukee Hospital, (2d Ward)	1		
Eighth Ward	9				
Ninth Ward	14				

DAILY MORTALITY.

1st	3	12th	4	23d	3
2d	2	13th	3	24th	6
3d	6	14th	2	25th	2
4th	3	15th	5	26th	5
5th	3	16th	15	27th	4
6th	5	17th	31	28th	11
7th	1	18th	5	29th	3
8th	6	19th	3	30th	9
9th	4	20th	4	31st	5
10th	3	21st	8		
11th	3	22d	3	Total	170

MONTHLY REPORT OF DEATHS

FOR

AUGUST 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Cholera—Infantum	43
Cholera Morbus	1
Croup	7
Diarrhœa	30
Dysentery	6
Diphtheria	9
Entero-Colitis	1
Fever—Scarlet	1
Fever—Typhoid	1
Fever—Typhus	1
Measles	2
Whooping Cough	3

ORDER 3.—*Dietetic.*

Inanition	2

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Cancer	2
Cancer—Stomach	2
Marasmus	5

ORDER 2—*Tubercular.*

Consumption	14
Hydrocephalus	2
Tabes Mesenterica	1
Tubercular Bronchitis	1
Tuberrular Enteritis	1
Tubercular Meningitis	2

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	1
Apoplexy—Cerebral	1
Congestion of Brain	3
Convulsions—Infantile	40
Inflammation of Brain	4
Meningitis	10
Paralysis	2
Trismus Nascentium	1

ORDER 2—*Circulatory.*

Dropsy General	3
Valvular Disease of Heart	1

ORDER 3—*Respiratory.*

Bronchitis	1
Congestion of Lungs	3
Pneumonia	4

ORDER 4—*Digestive*

Colic Billious	1
Gastro-Enteritis	3
Gastritis	2
Peritonitis	2

ORDER 6.—*Generative.*

Uterine Tumor	1

ORDER 8.—*Locomotory, Integumentary.*

Adenitis	1
Carbuncle	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Debility—Infantile	6
Dentition	1
Hœmorrage Ubilical	1
Icterus Neonatorum	1
Spina Bifida	1
Intestinal Catarrh	3

ORDER 2—*Women.*

Puerperal Metritis	1

ORDER 3—*Old Age.*

Debility—Senile	2
Gangrene—Senile	1

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Drowned	4
Fracture of skull	1

ORDER 3.—*Suicide.*

Poisoning	1
Suicide by cutting throat	1
Total Deaths	246

Stillborn	5
Premature Birth	3
Total	8

SEX.

Adults—Male	21	Total Females	111
Adults—Female	24	Total Adults	45
Minors—Male	114	Total Minors	201
Minors—Female	87		
Total Males	135	Grand Total	246

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	195	Corresponding month in 1875	184
Corresponding month in 1876	299		

AUGUST—*Continued.*

AGE.

	S.	M.	W.	T'l		S.	M.	W.	T'l.
Males, under 1 year	72	....	....	72	Females, under 1 year	50	....	....	50
" from 1 to 5	33	....	....	33	" from 1 to 5	26	....	....	26
" from 5 to 20	9	....	....	9	" from 5 to 20	11	....	....	11
" from 20 to 30	1	....	....	1	" from 20 to 30	2	3	....	5
" from 30 to 40	....	5	....	5	" from 30 to 40	....	2	....	2
" from 40 to 50	....	2	1	3	" from 40 to 50	....	4	....	4
" from 50 to 60	1	5	....	6	" from 50 to 60	....	4	....	4
" from 60 to 70	1	2	....	3	" from 60 to 70	1	3	....	4
" from 70 to 80	....	1	1	2	" from 70 to 80	....	1	....	1
" over 80 years	....	1	....	1	" over 80 years	1	2	1	4
Total—Males	117	16	2	135	Total—Females	91	19	1	111
	....	....	....	....	Grand Total	....	....	....	246

NATIVITIES.

Wisconsin	10	France	..	Sweden	..
Milwaukee	185	Russia	..	Denmark	..
Other States	10	Poland	2	Austria	..
Germany	29	Switzerland	..	Netherlands	..
Ireland	6	Bohemia	..	Elsewhere	..
England	3	Hungary	..	Italy	..
Scotland	..	Holland	1		
Wales	..	Norway	..	Total	246
Canada	..				

CEMETERIES WHERE INTERRED.

Almshouse Farm	3	National Home	..	Elsewhere	3
Calvary	62	Spring Hill	..		
Forest Home	60	Trinity	26	Total	246
Greenwood	..	Union	92		

LOCALITIES.

First Ward	13	Tenth Ward	20	St. Vincent's Infant Asylum (5th Ward)	6
Second Ward	38	Eleventh Ward	18	Alms House, Wauwatosa	..
Third Ward	12	Twelfth Ward	20	Elsewhere	..
Fourth Ward	16	Thirteenth Ward	12		
Fifth Ward	21	St. Mary's Hospital (1st Ward)	1	Total	246
Sixth Ward	22	Milwaukee Hospital (2d Ward)	1		
Seventh Ward	14				
Eighth Ward	9				
Ninth Ward	23				

DAILY MORTALITY.

1st	2	12th	8	23d	11
2d	8	13th	6	24th	16
3d	8	14th	11	25th	5
4th	10	15th	5	26th	9
5th	7	16th	9	27th	10
6th	9	17th	6	28th	6
7th	10	18th	4	29th	8
8th	9	19th	8	30th	7
9th	9	20th	9	31st	8
10th	11	21st	5		
11th	6	22d	6	Total	246

MONTHLY REPORT OF DEATHS

FOR

SEPTEMBER 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Cholera—Infatum	14
Croup	7
Diarrhœa	15
Dysentery	4
Diphtheria	5
Fever—Typhoid	1
Measles	1
Whooping Cough	3
Paratitis	1

ORDER 3—*Dietetic.*

Alcoholism—Chronic	1

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic*

Anæmia	1
Cancer	1
Cancer—Ovary	1
Cancer—Stomach	1
Marasmus	9

ORDER 2—*Tubercular.*

Consumption	14
Hydrocephalus	4
" —Chronic	1
Tabes Mesenterica	1
Tubercular Bronchitis	1
" Enteritis	1
" Laryngitis	1

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	2
Apoplexy—Cerebral	4
" Pulmonary	3
Convulsions—Infantile	32
Meningitis	7
Paralysis	1
Tetanus	1
Trismus Nascentium	1
Spasms	1
Neuralgia	1

ORDER 2.—*Circulatory.*

Dropsy General	2
Fatty Degeneration of Heart	1
Paralysis of Heart	1
Valvular Disease of Heart	2

ORDER 3.—*Respiratory.*

Bronchitis	5
Catarrh	1
Œdema—Lungs	1
Pneumonia	2

ORDER 4.—*Digestive.*

Enteritis	1
Gastro-Enteritis	1
Gastritis	1
Peritonitis	1

ORDER 5 —*Urinary.*

Diabetes Mellitus	1
Nephritis	1
Bright's Disease	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1.—*Children.*

Congenital Debility	1
Debility—Infantile	4
Dentition	2

ORDER 2.—*Women.*

Hæmorrage, womb	1
Puerperal Convulsions	1

ORDER 3.—*Old Age.*

Debility—Senile	4

CLASS V.

VIOLENCE.

ORDER 1.—*Accident.*

Burned	1
Drowned	3
Wound—by fall	1

ORDER 3.—*Suicide.*

Poisoning	1
Total Deaths	182

Stillborn	11
Premature Birth	3
Total	14

SEX.

Adults—Male	23
Adults—Female	27
Minors—Male	64
Minors—Female	68
Total Males	87
Total Females	95
Total Adults	50
Total Minors	132
Grand Total	182

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	179
Corresponding month in 1876	257
Corresponding month in 1875	181

SEPTEMBER—*Continued.*

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males, under 1 year	37	....	....	37	Females, under 1 year	34	....	....	34
" from 1 to 5	19	....	....	19	" from 1 to 5	24	....	....	24
" from 5 to 20	8	....	....	8	" from 5 to 20	10	....	....	10
" from 20 to 30	1	1	....	2	" from 20 to 30	4	3	....	7
" ftom 30 to 40	1	....	....	1	" from 30 to 40	....	4	....	4
" from 40 to 50	....	5	....	5	" from 40 to 50	....	1	....	1
" from 50 to 60	1	5	....	6	" from 50 to 60	1	4	1	6
" from 60 to 70	....	3	2	5	" from 60 to 70	....	2	2	4
" from 70 to 80	1	1	....	2	" from 70 to 80	1	2	....	3
" over 80 years	1	1	....	2	" over 80 years	....	1	1	2
Total—Males	69	16	2	87	Total Females	74	17	4	95
					Grand Total	....	....	....	182

NATIVITIES.

Wisconsin	7	France	..	Sweden	..
Milwaukee	125	Russia	..	Denmark	..
Other States	8	Poland	2	Austria	..
Germany	26	Switzerland	3	Netherlands	..
Ireland	5	Bohemia	2	Elsewhere	..
Scotland	..	Hungary	..	Italy	..
Wales	..	Holland	..		
Canada	4	Norway	..	Total	182

CEMETERIES WHERE INTERRED.

Almshouse Farm	3	National Home	..	Elsewhere	9
Calvary	45	Spring Hill	3		
Forest Home	39	Trinity	13	Total	182
Greenwood	1	Union	69		

LOCALITIES.

First Ward	13	Tenth Ward	14	Asylum Little Sisters Poor (4th Ward)	..
Second Ward	30	Eleventh Ward	17	St. Vincent's Infant Asylum (5th Ward)	1
Third Ward	7	Twelfth Ward	7	House of Correction (11th Ward)	0
Fourth Ward	15	Thirteenth Ward	7	Elsewhere	4
Fifth Ward	7	Orphan Asylum (1st W'd)	..		
Sixth Ward	19	St. Mary's Hospital (1st Ward)	0	Total	182
Seventh Ward	11	Milwaukee Hospital (2d Ward)	1		
Eighth Ward	9				
Ninth Ward	19				

DAILY MORTALITY.

1st	11	12th	6	23d	10
2d	7	13th	6	24th	6
3d	6	14th	5	25th	9
4th	7	15th	11	26th	6
5th	12	16th	11	27th	5
6th	3	17th	4	28th	6
7th	1	18th	3	29th	3
8th	7	19th	4	30th	7
9th	4	20th	8		
10th	5	21st	5	Total	182
11th	4	22d	..		

MONTHTY REPORT OF DEATHS

FOR

OCTOBER 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Cholera—Infantum	2
Cholera—Morbus	1
Croup	8
Diarrhœa	3
Diphtheria	19
Erysipelas	1
Fever -Scarlet	2
" Typhoid	2
Fever—Typho Malarial	2
" Typhus	2
Measles	2
Pyæmia	1
Whooping Cough	2

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Cancer	1
Marasmus	3

ORDER 2—*Tubercular.*

Abscess Lumbar	1
Consumption	6
Hydrocephalus	3

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Convulsions—Infantile	17
Meningitis	3
Paralysis	2

ORDER 2—*Circulatory.*

Dropsy General	2
Dropsy of Heart	1
Paralysis of Heart	2
Phlebitis	1
Valvular Disease of Heart.	3

ORDER 3—*Respiratory.*

Bronchitis	6
Congestion of Lungs	2
Emphysema	1
Œdema—Glottidis	1
Œdema—Lungs	2
Pneumonia	4

ORDER 4—*Digestive.*

Ascites	1
Enteritis	2
Gastro Enteritis	2
Gastritis	1
Peritonitis	1
Cirhossis of Liver	1
Inflammation Stomach	2

ORDER 5.—*Urinary.*

Uræmia	1
Bright's Disease	2

ORDER 6—*Generative.*

Uterine Tumor	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Atelectasis Pulmonum	1
Debility Infantile	5
Dentition	1

ORDER 2—*Women.*

Puerperal Septicæmia	1

ORDER 3—*Old Age.*

Debility—Senile	3

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Drowned	2
Fracture of Skull	1
Wound—by fall	2
Unknown	1

ORDER 3—*Suicide.*

Poisoning	1
Unknown	1
Total Deaths	141

Stillborn	6
Premature Birth	2
Total	8

SEX.

Adults—Male	17
Adults—Female	24
Minors—Male	48
Minors—Female	52
Total Males	65

Total Females	76
Total Adults	41
Total Minors	100
Grand Total	141

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877..............169
" " " 1876..............189

Corresponding month in 1875..............130

OCTOBER—*Continued.*

AGE.

	S-	M.	W.	T'l.		S.	M.	W.	T'l.
Males under 1 year	20	....	....	20	Females, under 1 year	18	....	....	18
" from 1 to 5	15	....	...	15	" from 1 to 5	21	....	....	21
" from 5 to 20	13	....	....	13	" from 5 to 20	13	....	....	13
" from 20 to 30	2	1	....	3	" from 20 to 30	6	2	....	8
" from 30 to 40	....	1	....	1	" from 30 to 40	1	2	....	3
" from 40 to 50	....	2	....	2	" from 40 to 50	....	2	....	2
" from 50 to 60	3	3	1	7	" from 50 to 60	....	5	....	5
" from 60 to 70	....	2	....	2	" from 60 to 70	....	1	....	1
" from 70 to 80	1	1	....	2	" from 70 to 80	....	2	....	2
" over 80 years	....	....	....	....	" over 80 years	....	1	2	3
Total—Males	54	10	1	65	Total—Females	59	15	2	76
					Grand Total	....	....	....	141

NATIVITIES.

Milwaukee	83	France	..	Sweden	..
Wisconsin	9	Russia	..	Denmark	1
Other States	13	Poland	..	Austria	..
Germany	23	Switzerland	..	Netherlands	..
Ireland	5	Bohemia	3	Not given	..
England	2	Hungary	..	Italy	..
Scotland	1	Holland	..		
Wales	..	Norway	1	Total	141
Canada	..				

CEMETERIES WHERE INTERRED.

Almshouse Farm	1	National Home	..	Elsewhere	6
Calvary	40	Spring Hill	..		
Forest Home	32	Trinity	14	Total	141
Greenwood	1	Union	47		

LOCALITIES.

First Ward	7	Tenth Ward	12	St. Vincent's Infant Asylum (5th Ward)	3
Second Ward	25	Eleventh Ward	16	Alms House, Wauwatosa	..
Third Ward	3	Twelfth Ward	2	Elsewhere	..
Fourth Ward	12	Thirteenth Ward	4	Morgue, 7th Ward	..
Fifth Ward	12	St. Mary's Hospital (1st Ward)	1		
Sixth Ward	11	Milwaukee Hospital (2d Ward)	1	Total	141
Seventh Ward	5				
Eighth Ward	13				
Ninth Ward	14				

DAILY MORTALITY.

1st	3	12th	4	23d	9
2d	6	13th	1	24th	4
3d	4	14th	10	25th	5
4th	8	15th	7	26th	5
5th	6	16th	4	27th	4
6th	6	17th	7	28th	3
7th	5	18th	1	29th	6
8th	1	19th	1	30th	3
9th	1	20th	4	31st	1
10th	6	21st	5		
11th	2	22d	10	Total	141

MONTHLY REPORT OF DEATHS.

FOR

NOVEMBER, 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Croup	8
Diphtheria	16
Erysipelas	1
Fever—Typhoid	2
Fever—Typho-Malaria	1
Fever—Typhus	3
Measles	1
Whooping Cough	1

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Cancer	1
Cancer—Intestines	1
Cancer—Stomach	1
Cancer—Womb	1
Marasmus	3
Rheumatism	1

ORDER 2—*Tubercular.*

Consumption	18
Tubercular Bronchitis	1

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Apoplexy—Cerebral	1
Apoplexy—Pulmononary	1
Congestion of Brain	2
Convulsions—Infantile	21
Epilepsy	1
Inflammation of Brain	3
Meningitis	4

ORDER 2—*Circulatory.*

Endocarditis	1
Paralysis of Heart	1
Phlebitis	1
Valvular Disease of Heart	2

ORDER 3—*Respiratory.*

Bronchitis	3
Congestion of Lung	1
Laryngitis	2
Œdema—Glottidis	1
" Lungs	2
Pneumonia	6

ORDER 4—*Digestive.*

Enteritis	1
Gastritis	2
Peritonitis	1
Cirrirosis of Liver	2
Hepatitis	1
Jaundice	1

ORDER 5—*Urinary.*

Cystitis	1
Nephritis	1

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Debility—Infantile	4
Dentition	2

ORDER 3—*Old Age.*

Debility—Senile	3
Gangrene—Senile	2

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Drowned	1
Wound—by fall	1
Unknown	1
Total Deaths	137

Stillborn	8
Premature Birth	3
Total	11

SEX.

Adults—Male	27	Total Females	63
Adults—Females	26	Total Adults	53
Minors—Males	47	Total Minors	84
Minors—Females	37		
Total Males	74	Grand Total	137

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	168	Corresponding month in 1875	94
Corresponding month in 1876	236		

NOVEMBER—*Continued.*

AGE.

	S.	M.	W.	T'l		S.	M.	W.	T'l.
Males, under 1 year	16	....	....	16	Females. under 1 year	16	....	....	16
" from 1 to 5	21	....	....	21	" from 1 to 5	8	....	....	8
" from 5 to 20	10	....	....	10	" from 5 to 20	13	....	....	13
" from 20 to 30	1	3	....	4	" from 20 to 30	2	5	....	7
" from 30 to 40	4	2	....	6	" from 30 to 40	1	4	....	5
" from 40 to 50	....	3	....	3	" from 40 to 50	....	1	....	1
" from 50 to 60	1	4	....	5	" from 50 to 60	....	3	....	3
" from 60 to 70	1	5	1	7	" from 60 to 70	....	5	1	6
" from 70 to 80	....	1	....	1	" from 70 to 80	1	1	1	3
" over 80 years	....	....	1	1	" over 80 years	....	....	1	1
Total—Males	54	18	2	74	Total—Females	41	19	3	63
	....	....	....	....	Grand Total	....	....	....	137

NATIVITIES.

Milwaukee	79	France	..	Sweden	..
Wisconsin	2	Russia	..	Denmark	1
Other States	8	Poland	1	Austria	..
Germany	32	Switzerland	1	Netherlands	..
Ireland	6	Bohemia	2	Not given	1
England	3	Hungary	..	Italy	..
Scotland	..	Holland	..		
Wales	..	Norway	1	Total	137
Canada	..				

CEMETERIES WHERE INTERRED.

Almshouse Farm	1	National Home	..	Elsewhere	6
Calvary	38	Spring Hill	2		
Forest Home	33	Trinity	7	Total	137
Greenwood	1	Union	49		

LOCALITIES.

First Ward	7	Tenth Ward	10	St. Vincent's Infant Asylum (5th Ward)	2
Second Ward	26	Eleventh Ward	13	Alms House, Wauwatosa	..
Third Ward	7	Twelfth Ward	7	House of Correction (11th Ward)	..
Fourth Ward	9	Thirteenth Ward	9	Morgue, 7th Ward	..
Fifth Ward	4	St. Mary's Hospital (1st Ward)	2		
Sixth Ward	8	St. Joseph's Institute, (1st Ward)	1	Total	137
Seventh Ward	5				
Eighth Ward	9				
Ninth Ward	17				

DAILY MORTALITY.

1st	3	12th	4	23d	3
2d	3	13th	6	24th	10
3d	5	14th	3	25th	6
4th	6	15th	4	26th	3
5th	7	16th	2	27th	4
6th	6	17th	5	28th	1
7th	3	18th	8	29th	5
8th	1	19th	5	30th	8
9th	6	20th	1		
10th	2	21st	7	Total	137
11th	4	22d	6		

MONTHLY REPORT OF DEATHS

FOR

DECEMBER 1878.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

ORDER 1—*Miasmatic.*

Croup	10
Diphtheria	16
Fever—Hectic	1
Fever—Scarlet	2
Measles	3
Whooping Cough	2

CLASS II.

CONSTITUTIONAL.

ORDER 1—*Diathetic.*

Cancer	1
Cancer—Stomach	1
Rheumatism	1

ORDER 2—*Tubercular.*

Consumption	19
Tubercular Enteritis	1
Ill defined	2

CLASS III.

LOCAL.

ORDER 1—*Nervous.*

Atrophy	2
Apoplexy—Cerebral	1
Apoplexy—Pulmononary	1
Congestion of Brain	1
Convulsions—Infantile	16
Meningitis	4
Tetanus	1

ORDER 2—*Circulatory.*

Angina Pectoris	2
Dropsy General	2
Embolism Cerebral	1
Paralysis of Heart	1
Valvular Disease of Heart	2

ORDER 3—*Respiratory.*

Bronchitis	6
Congestion of Lungs	2
Laryngitis	2
Œdema—Lungs	2
Pleuritis	1
Pneumonia	12

ORDER 4—*Digestive.*

Enteritis	1
Peritonitis	3
Cirhossis of Liver	1

ORDER 5.—*Urinary.*

Nephritis	2

CLASS IV.

DEVELOPMENTAL.

ORDER 1—*Children.*

Atelectasis Pulmonum	1
Congenital Debility	1
Debility Infantile	3
Dentition	1
Intestinal Catarrh	1

ORDER 2—*Women.*

Puerperal Convulsions	1

ORDER 3—*Old Age.*

Debility—Senile	3
Gangrene—Senile	2

CLASS V.

VIOLENCE.

ORDER 1—*Accident.*

Shock from R. R., Accident	2
Scalded	1
Total Deaths	140

Stillborn	10
Premature Birth	2
Total	12

SEX.

Adults—Male	22	Total Females	72
Adults—Female	32	Total Adults	54
Minors—Male	46	Total Minors	86
Minors—Female	40		
Total Males	68	Grand Total	140

COMPARATIVE MONTHLY MORTALITY.

Corresponding month in 1877	179	Corresponding month in 1875	118
" " " 1876	208		

DECEMBER—*Continued.*

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males under 1 year	23	....	....	23	Females, under 1 year	13	....	....	13
" from 1 to 5	17	....	....	17	" from 1 to 5	15	....	....	15
" from 5 to 20	6	....	....	6	" from 5 to 20	12	....	....	12
" from 20 to 30	5	1	....	6	" from 20 to 30	3	3	....	6
" from 30 to 40	....	2	....	2	" from 30 to 40	....	2	....	2
" from 40 to 50	....	3	....	3	" from 40 to 50	....	1	...	1
" from 50 to 60	1	7	....	8	" from 50 to 60	2	6	3	11
" from 60 to 70	....	1	....	1	" from 60 to 70	1	2	1	4
" from 70 to 80	....	1	....	1	" from 70 to 80	1	....	2	3
" over 80 years	....	....	1	1	" over 80 years	1	2	2	5
Total—Males	52	15	1	68	Total—Females	48	16	8	72
					Grand Total	....	....	....	140

NATIVITIES.

Milwaukee	86	France	..	Sweden	..
Wisconsin	4	Russia	..	Denmark	..
Other States	6	Poland	..	Austria	1
Germany	32	Switzerland	..	Netherlands	1
Ireland	4	Bohemia	2	Not given	..
England	1	Hungary	..	Italy	..
Scotland	1	Holland	..	China	1
Wales	..	Norway	1		
Canada	..			Total	140

CEMETERIES WHERE INTERRED.

Almshouse Farm	..	National Home	..	Elsewhere	8
Calvary	39	Spring Hill	1		
Forest Home	41	Trinity	13	Total	140
Greenwood	1	Union	37		

LOCALITIES.

First Ward	7	Tenth Ward	12	St. Vincent's Infant Asylum (5th Ward)	3
Second Ward	16	Eleventh Ward	16	Alms House, Wauwatosa	..
Third Ward	5	Twelfth Ward	17	House of Correction (11th Ward)	..
Fourth Ward	10	Thirteenth Ward	2	Morgue, 7th Ward	..
Fifth Ward	11	St. Mary's Hospital (1st Ward)	1		
Sixth Ward	12	St. Joseph's Institute, (1st Ward)	..	Total	140
Seventh Ward	8				
Eighth Ward	8				
Ninth Ward	13				

DAILY MORTALITY.

1st	8	12th	1	23d	1
2d	2	13th	6	24th	3
3d	2	14th	3	25th	3
4th	3	15th	5	26th	3
5th	4	16th	1	27th	3
6th	4	17th	9	28th	4
7th	4	18th	7	29th	5
8th	5	19th	8	30th	3
9th	5	20th	4	31st	9
10th	5	21st	8		
11th	6	22d	6	Total	140

SUMMARY OF MORTALITY

FOR THE YEAR 1878.

Total deaths, 1774; or 14.35 per thousand of population.

CAUSES OF DEATH.

CLASS I.

ZYMOTIC.

Order 1—*Miasmatic.*

Cholera—Infantum	65
Cholera—Morbus	3
Croup	71
Diarrhœa	58
Dysentery	12
Diphtheria	103
Entero-Colitis	1
Erysipelas	4
Fever—Bilious	1
Fever—Hectic	1
Fever—Remittent	1
Fever—Scarlet	26
Fever—Typhoid	13
Fever—Typho-Malaria	3
Fever—Typhus	9
Measles	9
Pymæia	4
Small Pox	13
Whooping Cough	12
Paratitis	1

Order 3.—*Dietetic.*

Alcoholism—Chronic	2
Inanition	8

CLASS II.

CONSTITUTIONAL.

Order 1—*Diathetic.*

Anæmia	2
Cancer	12
Cancer—Breast	3
Cancer—Intestines	2
Cancer—Ovary	1
Cancer—Stomach	9
Cancer—Uterus	4
Gout	1
Marasmus	44
Rheumatism	3

Order 2—*Tubercular.*

Abscess Lumbar	1
Consumption	175
Hydrocephalus	17
" —Chronic	1
Scrofula	4
Tabes Mesenterica	4
Tubercular Bronchitis	8
Tubercular Enteritis	5
" Laryngitis	1
Tubercular Meningitis	4
Tubercular Peritonitis	3
Ill Defined	10

CLASS III.

LOCAL.

Order 1—*Nervous.*

Atrophy	13
Apoplexy—Cerebral	28
Apoplexy—Pulmononary	11
Congestion of Brain	14
Convulsions—Infantile	254
Chorea	1
Epilepsy	3
Inflammation of Brain	14
Meningitis	66
Myelitis	1
Sun Stroke	12
Tetanus	4
Trismus Nascentium	4
Spasms	1
Neuralgia	1

Order 2—*Circulatory.*

Angina Pectoris	4
Dropsy General	21
Dropsy of Heart	1
Embolism Cerebral	2
Endocarditis	3
Fatty Degeneration of Heart	1
Heart Clot	1
Paralysis of Heart	19
Phlebitis	2
Thrombosis Pulmonary	1
Valvular Disease of Heart	31
Pericarditis	2

Order 3—*Respiratory.*

Asthma	2
Bronchitis	45
Congestion of Lungs	19
Emphysema	5
Hæmoptysis	3
Laryngitis	6
Œdema—Glottidis	4
Œdema—Lungs	17
Pleuritis	3
Pneumonia	84

Order 4—*Digestive.*

Ascites	4
Colic Billious	1
Enteritis	14
Gastro-Enteritis	8
Gastritis	11
Peritonitis	12
Cirhossis of Liver	6
Congestion of Liver	2
Hepatitis	7
Hernia	3
Inflammation Stomach	4
Jaundice	1
Intussusception	1

Order 5—*Urinary.*

Cystitis	4
Diabetes Mellitus	2
Hæmorrage of Kidney	1
Nephritis	10
Uræmia	5
Bright's Disease	3

Order 6.—*Generative.*

Ovarian Tumor	1
Uterine Tumor	2

Order 8.—*Locomotory, Integumentary.*

Adenitis	1
Carbuncle	1
Pemphigus	1

CLASS IV.

DEVELOPMENTAL.

Order 1—*Children.*

Atelectasis Pulmonum	4
Congenital Debility	9
Cyanosis	2
Debility—Infantile	50
Dentition	10
Hœmorrage Ubilical	1
Icterus Neonatorum	3
Spina Bifida	1
Intestinal Catarrh	5

Order 2—*Women.*

Abortion	1
Hæmorrage, womb	3
Placenta Prævia	1
Puerperal Convulsions	9
Puerperal Metritis	3
Puerperal Peritonitis	4
Puerperal Septicæmia	1
Tedious Labor	1

Order 3—*Old Age.*

Debility—Senile	45
Gangrene—Senile	12

SUMMARY OF MORTALITY.—*Continued.*

CLASS V.

VIOLENCE.

Order 1—*Accident.*

Burned	2
Drowned	21
Fracture of skull	3
Killed by Lightning	1
Poisoned	1
Shock from R. R. Accid't	10
Wound—Lacerated	4
Wound—by fall	6
Scalded	1
Unknown	2

Order 2—*Homicide.*

Murdered	1

Order 3.—*Suicide.*

Drowning	2
Gunshot	2
Hanging	3
Poisoning	5
Cutting throat	1
Unknown	2
Total Deaths	1774

Stillborn	131
Premature Birth	39
Total	170

SEX.

Adults—Male	315
Adults—Females	323
Minors—Males	596
Minors—Females	540
Total Males	911
Total Females	863
Total Adults	638
Total Minors	1136
Grand Total	1774

AGE.

	S.	M.	W.	T'l.		S.	M.	W.	T'l.
Males, under 1 year	331	....	....	331	Females, under 1 year	266	....	....	266
" from 1 to 5	171	....	....	171	" from 1 to 5	155	...	....	155
" from 5 to 20	94	....	....	94	" from 5 to 20	115	6	....	121
" from 20 to 30	36	15	....	51	" from 20 to 30	32	42	....	74
" from 30 to 40	15	33	1	49	" from 30 to 40	4	41	....	45
" from 40 to 50	11	46	2	59	" from 40 to 50	3	30	4	37
" from 50 to 60	6	55	3	64	" from 50 to 60	3	52	6	61
" from 60 to 70	5	36	6	47	" from 60 to 70	9	33	10	52
" from 70 to 80	2	22	4	28	" from 70 to 80	4	17	8	29
" over 80 years	2	11	4	17	" over 80 years	2	11	10	23
Total—Males	673	218	20	911	Total—Females	593	232	38	863
	....	....	....	....	Grand Total	....	....	....	1774

NATIVITIES.

Milwaukee	1038
Wisconsin	63
Other States	122
Germany	387
Ireland	55
England	22
Scotland	6
Canada	10
France	1
Poland	10
Switzerland	7
Bohemia	18
Holland	7
Norway	10
Sweden	1
Denmark	2
Austria	4
Netherlands	2
Not given	7
Italy	1
China	1
Total	1774

CEMETERIES WHERE INTERRED.

Almshouse Farm	23
Calvary	448
Forest Home	448
Greenwood	13
National Home	1
Spring Hill	13
Trinity	130
Union	628
Elsewhere	70
Total	1774

SUMMARY OF MORTALITY.—*Continued.*

LOCALITIES.

First Ward	
Second Ward	264
Third Ward	89
Fourth Ward	148
Fifth Ward	111
Sixth Ward	153
Seventh Ward	83
Eighth Ward	105
Ninth Ward	186
Tenth Ward	150
Eleventh Ward	145
Twelfth Ward	84
Thirteenth Ward	62
St. Mary's Hospital (1st Ward)	10
St. Joseph's Institute (1st Ward)	3
St. Vincent's Infant Asylum (5th Ward)	33
Milwaukee Hospital	16
Convent of Capuchins (6th Ward)	1
Alms House	4
House of Correction (11th Ward)	1
Morgue (7th Ward)	1
Total	1774

TABLE SHOWING MORTALITY FOR 1878 BY MONTHS AND LOCALITIES AND THE PER CENTAGE OF EACH LOCALITY TO THE WHOLE MORTALITY.

	Jan.	Feb.	M'rch	April	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	per cent. to whole.
First Ward	6	11	9	15	13	12	12	13	13	7	7	7	125	7.0
Second Ward	18	19	22	19	11	14	26	38	30	25	26	16	264	11.0
Third Ward	7	8	10	3	7	8	12	12	7	3	7	5	89	4.9
Fourth Ward	10	11	16	20	8	7	13	16	15	12	9	11	148	8.3
Fifth Ward	7	11	6	8	6	8	10	21	7	12	4	11	111	6.3
Sixth Ward	17	10	13	12	9	7	13	22	19	11	8	12	153	8.5
Seventh Ward	6	7	0	3	4	2	13	14	10	5	5	8	83	4.7
Eighth Ward	8	14	8	7	4	7	9	9	9	13	9	8	105	5.9
Ninth Ward	12	15	13	20	17	9	14	23	19	14	17	13	186	10.5
Tenth Ward	15	8	11	12	13	12	11	20	14	12	10	12	150	8.4
Eleventh Ward	9	6	8	5	10	8	19	18	17	16	13	16	145	8.2
Twelfth Ward	3	1	9	6	1	4	7	20	7	2	7	17	84	4.7
Thirteenth Ward	4	4	3	5	7		5	12	7	4	9	2	62	3.5
Orphan Asylum	1		1								1		3	.2
St. Mary's Hospital				1	1	1	3	1		1	2		10	.6
Milwauke Hospital	3	1	2	1	2	2	1	1	2	1			16	.9
Almshouse													4	.2
St Vincent		6	2	5		4	1	6	1	3	2	3	33	1.8
House of Correction						1							1	.1
Convent of Capuchins							1		0				1	.1
Morgue 7th ward									1				1	.1
Total	126	132	139	142	113	106	170	246	182	141	137	140	1774	100;

TABLE

Showing Sick Cases and Deaths from Small Pox, Scarlet Fever and Diphtheria by weeks during tне years 1877 and 1878. The figures in the left hand columns are for 1878; in the right, for 1877.

1878–1877. WEEKS ENDING.			SMALL POX.				DIPHTHERIA.				SCARLET FEVER.			
			Sick Cases,		Deaths.		Sick Cases.		Deaths		Sick Cases.		Deaths.	
Jan.	5	6	2	14	1	6	5	8	1	2	3	21	2	7
“	12	13	13	40	1	10	6	4	..	1	6	12	..	4
“	19	20	5	21	2	8	1	12	1	3	2	24	1	8
“	26	27	5	25	3	3	5	20	2	5	9	15	1	5
Feb.	2	3	4	18	1	9	4	16	..	4	5	18	2	6
“	9	10	10	50	..	13	8	20	1	4	4	19	2	5
“	16	17	9	21	1	2	2	2	1	2	3	35	2	9
“	23	24	5	24	1	4	3	3	3	1	2	25	..	3
March	2	3	..	28	..	8	4	17	2	7	1	20	2	5
“	9	10	2	44	..	11	2	14	..	4	4	29	1	4
“	16	17	..	31	..	7	4	13	1	1	3	21	..	3
“	23	24	1	20	..	6	2	14	1	2	2	19	..	1
“	30	31	..	21	1	10	4	7	3	1	2	5	..	3
April	6	7	..	23	..	7	3	13	1	1	3	14	..	1
“	13	14	..	20	..	3	3	3	2	2	1	18	..	3
“	20	21	..	12	..	3	6	6	3	3	7	6	1	3
“	27	28	3	33	..	5	6	19	3	1	3	13	..	5
May	4	5	..	24	..	12	1	4	2	1	1	10	1	2
“	11	12	9	24	..	4	2	7	1	0	1	17	..	3
“	18	19	3	24	..	9	2	1	..	1	1	13	1	5
“	25	26	2	27	..	4	1	1	2	1	..	10	..	1
June	1	2	2	32	..	10	1	2	1	2	1	5	1	3
“	8	9	..	31	1	7	3	2	..	0	3	12	..	1
“	15	16	..	18	..	11	6	2	1	1	2	10	...	3
“	22	23	..	23	..	4	3	7	1	2	1	19	..	4
“	29	30	..	14	..	6	6	4	..	2	3	5	..	3
July	6	7	..	20	..	6	3	7	1	0	3	5	1	1
“	13	14	3	11	1	4	..	8	..	3	1	8	..	3
“	20	21	..	8	..	3	1	5	..	1	4	14	1	1
“	27	28	..	8	..	3	..	2	1	2	1	19	1	3
Aug.	3	4	..	1	..	1	9	9	2	4	1	12	1	5
“	10	11	..	6	..	5	5	7	4	1	..	14	1	0
“	17	18	..	3	..	0	4	5	1	0	..	12	..	5
“	24	25	..	17	..	2	8	2	2	1	2	15	..	3
“	31	(Sept.) 1	..	4	..	1	5	4	5	1	1	14	..	5
Sept	7	“ 8	..	19	..	3	5	8	1	0	2	11	..	3
“	14	“ 15	..	2	..	3	6	1	3	2	..	14	..	2
“	21	“ 22	..	25	..	2	2	8	..	4	..	8	..	2
“	28	“ 29	..	8	..	3	13	3	1	2	1	2	..	2
Oct.	5	6	..	7	..	4	12	1	2	2	2	6	1	3
“	12	13	..	6	..	1	15	7	4	2	1	17	1	3
“	19	20	..	8	..	4	11	8	4	3	6	9	..	5
“	26	27	..	17	..	1	17	17	6	2	4	9	..	6
Nov.	2	3	..	18	..	3	24	14	3	0	1	16	..	3
“	9	10	..	29	..	4	19	17	5	3	3	6	..	0
“	16	17	..	18	..	13	18	13	..	0	2	12	..	1
“	23	24	..	32	..	5	22	10	3	2	2	9	..	2
“	30	(Dec.) 1	..	24	..	3	25	4	8	4	2	19	..	1
Dec.	7	“ 8	..	6	..	7	16	11	3	0	2	18	..	2
“	14	“ 15	..	15	..	5	12	4	4	3	3	11	..	2
“	21	“ 22	..	12	..	1	29	13	5	1	3	12	1	3
“	28	“ 29	..	8	..	5	14	6	2	2	7	8	1	3
Total			86	994	13	274	389	415	103	99	127	715	26	169

In 1877—of Scarlatina cases 24 per cent, proved fatal.
In 1878— “ “ 20 “ “ “
In 1877—Diphtheria, “ 24 “ “ “
In 1878 — “ “ 26 “ “ “
In 1877—Small Pox “ 28 “ “ “
In 3878— “ “ 15 “ “ “

RATE OF MORTALITY

In various American and Foreign Cities, compiled from the available returns for the years 1877 and 1878.

AMERICAN.	Population.	Ratio of Deaths Per 1,000. 1877.	Ratio of Deaths Per 1,000. 1878.
Milwaukee,	122,980	16.3	14 3
St. Louis,	501,488	11.6	17.8
Cincinnati,	280,000	16.4	15.8
Cleveland,	162,000	18.8	18.21
Providence,	103,000	19.4	19.4
Philadelphia,	850,856	19.5	18.9
Chicago,	440,000	19.5	18.4
Baltimore,	355,000	20.1	25.4
Boston,	350,000	20.5	20.5
San Francisco,	300,000	20.9	17.3
Brooklyn,	527,830	21.3	21.5
Richmond,	75,000	23.7	18.4
New York,	1,079,020	24.0	24.5
New Orleans,	210,000	25.5	31.9
Washington,	160,000	28.3	25.6
Charleston,	48,956	35.4	31.8
FOREIGN.			
London,	3,254,266	20.9	21.8
Birmingham,	343,676	22.6	24.2
Paris,	1,988,806	23.8	26.3
Glasgow,	491,844	23.9	24.7
Vienna,	714,548	24.5	29.8
Manchester,	351,189	25.9	27.3
Liverpool,	493,404	26.4	26.4
Berlin,	966,858	27.3	30.1
Dublin,	314,666	27.0	27.1
Calcutta,	429,535	29.8	31.9

The above table, although it is not exhaustive, nor even very extensive, may be regarded as representative. Milwaukee has a record in it, of which she may well be proud.

TABLE

Showing the Death ratio per 1000 of population per year for last 9½ years.

Estimated Population,...	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878
Deaths by Months, ...	70000	U.S. Cen's. 71440	77000	83000	School Cen's. 90000	95000	State Cen's 100775	111000	122980	123600
January, ...	....	90	113	175	143	116	137	108	221	126
February, ...	....	95	100	155	150	122	117	140	192	132
March,...................	....	90	98	163	123	114	149	179	217	139
April, ...	....	87	110	192	115	155	159	150	159	142
May,.....................	....	86	107	152	161	140	122	152	179	113
June,.	....	113	100	129	237	162	106	145	159	106
July,......................	141	220	103	222	172	228	149	198	226	170
August, ...	155	200	169	298	236	264	184	299	195	246
September,..............	200	170	176	285	258	240	181	257	179	182
October,.................	189	191	147	146	211	203	130	189	169	141
November,...............	142	148	152	121	137	140	118	236	168	137
December,...............	142	129	208	137	183	171	130	208	179	140
Total by Years,.........	969	1519	1583	2185	2026	2055	1682	2261	2243	1774
Ratio per 1000,...........	27.7	21.3	19.1	26.3	22.5	21.6	16.7	20.0	18.0	14.35

From this table it will be seen that the decrease in the death ratio of Milwaukee has been pretty constant during the decade. The decrease in 1875 was very marked, but was not maintained during the two subsequent years.

TABLE

Exhibiting the principal causes of disease, with the number and relative per cent. to all deaths, and the deaths from all causes by ages, male and female, and the comparative per cent. of total number, in 1877 and 1878.

	Cholera Infantum.	Violence.	Meningitis.	Diarrhœa.	Diphtheria.	Still born and premature births.	Scarlet Fever.	Consumption.	Infantile Convulsions.	Small Pox.	Pneumonia.	Remaining Causes.
1877.—No.	52	59	68	70	99	171	171	189	267	274	46	823
1878.— "	65	67	66	58	103	171	26	175	254	13	84	776
1877.—Per cent.	2.3	2.6	.3	3.1	4.4	7.7	7.7	8 4	11.9	12.2	2.1	36.7
1878.— " "	3.6	3.7	3.7	3.3	5.8	9.6	1.4	9.9	14.3	0 7	4.7	44.0

1877.—Total Adults, 734 of 2243 o. 32.7 per cent.
1878.— " " 638 of 1774, or 36 per cent
1877.—Total Minors 1509 of 2243 or 67 3 per cent.
1878.— " " 1206 of 1774, or 64 per cent.

	1878-1877. Males.		1878-1877. Females.		1878-1877. Deaths.		1878-1877. per cent.	
Under 1 year	18.6	18.0	14.9	15.8	597	757	33.8	33.5
From 1 to 5	9.7	11.3	8.9	10.4	326	487	21.7	18.6
" 5 to 20	5.3	5.3	6.9	6.5	215	265	11.8	12.2
" 20 to 30	2.9	3.5	4.2	4.2	125	172	7.7	7.1
" 30 to 40	2.8	3.1	2.5	2.2	94	118	5.3	5.3
" 40 to 50	3.3	2 5	2.1	1.9	96	97	4.3	5.4
" 50 to 50	3.5	3.9	3.4	2.2	125	137	6.1	6.9
" 60 to 70	2.6	2.7	2.9	1.7	99	99	4.4	5.5
" 70 to 80	1.6	1.9	1.6	1.6	57	79	3.5	3.2
over 80 years	1.0	0.6	1.3	0.7	40	32	1.4	2.3
1877.—Per cent	Males	52.8	Females	47.2	Total	2243		1.00
1878.— "	"	51.3	"	48.7	"	1774		1.00

TABLE

Showing the Death Rate by Nativities of Deceased Persons during the year 1877.

Of 2243 total deaths there were born in

Wisconsin	66.8	per cent.	Norway	0.4	per cent.
Other States	6.2	" "	Poland	0.3	" "
Germany	18.0	" "	Austria	0.2	" "
Ireland	4.0	" "	Unknown	0.2	" "
England	1.2	" "	Wales	0.1	" "
Holland	0.7	" "	France	0.1	" "
Bohemia	0.7	" "	Switzerland	0.1	" "
Canada	0.5	" "	Denmark	0.1	" "
Scotland	0.4	" "			
				100	

TABLE

showing the Death Rate by Nativities of deceased persons during the year 1878.

Of 1774 total deaths there were born in

Milwaukee	58.5	per cent.	Poland	0.6	per cent.
Wisconsin	3.6	" "	Austria	0.2	" "
Other States	6.9	" "	France	0.1	" "
Germany	21.8	" "	Switzerland	0.4	" "
Ireland	3 1	" "	Denmark	0.1	" "
England	1.2	" "	Belgium	0.1	" "
Holland	0.3	" "	Italy	0.1	" "
Bohemia	1.0	" "	China	0.1	" "
Canada	0.6	" "	Unkown	0.3	" "
Scotland	0.3	" "			
Norway	0.6	" "		100.0	
Sweden	0.1	" "			

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of January, 1878. Furnished for the use of the Board of Health.

JANUARY.	Barometer, Daily Mean.	Thermometer, Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of Weather.	Rain.
Day and Date.					7 a. m.	2 p. m.	9 p. m.		Inches.
Tuesday 1	29.921	27.7	84.3	N W	8	8	16	Lt. Snow.	0.04
Wednesday 2	30.221	16.5	74.0	N W	12	6	5	Clear.	0.01
Thursday.......... 3	29.913	24.0	86.3	S	8	14	5	Lt. Snow.	0.01
Friday.............. 4	30.020	11.0	93.3	N W	5	20	12	Lt. Snow.	0.06
Saturday........... 5	30.107	6.7	73.0	N W	6	6	12	Fair.	0.01
Sunday 6	30.163	3.0	78.0	N W	10	13	11	Clear.	0.00
Monday............ 7	30.421	5.7	63.3	S	8	6	12	Lt. Snow.	0 01
Tuesday 8	30.087	26 2	71.7	S W	9	10	9	Clear.	0.04
Wednesday 9	29.818	32.2	85.7	S	9	13	8	Lt. Snow.	0.05
Thursday...........10	29.701	33.7	93.3	N W	2	11	11	Cloudy.	0.15
Friday..............11	29.986	31.0	79.0	W	6	8	5	Clear.	0.00
Saturday............12	30.113	34.0	89.7	S E	8	10	14	Fair.	0.00
Sunday 13	29.921	33.0	89.3	N E	13	14	13	Cloudy.	0.00
Monday.............14	29.893	32.0	84.3	N W	10	10	12	Clearing.	0.02
Tuesday.............15	30.102	28.2	81.0	N W	12	10	7	Cloudy.	0.09
Wednesday 16	30.076	29.7	74.7	S W	5	12	8	Cloudy.	0.00
Thursday............17	29.967	29.2	88.3	N W	4	3	4	Cloudy.	0.00
Friday...............18	30.102	33.7	93.0	W	1	6	5	Cloudy.	0.00
Saturday............19	29.947	38.0	82.3	S W	4	5	5	Fair.	0.00
Sunday 20	29.914	34.5	100.0	N	11	20	17	Lt. Rain.	0.13
Monday.............21	29.892	32.0	85.7	N W	10	12	14	Cloudy.	0.00
Tuesday 22	30.053	23.0	80.0	N W	12	16	19	Clear.	0.00
Wednesday.........23	30.321	19.0	74.0	S W	8	7	13	Fair.	0.00
Thursday 24	29.830	36.5	75.0	S W	12	12	5	Clear.	1.00
Friday...............25	29.885	31.2	92.7	N E	16	14	11	Hy. Snow.	0.18
Saturday. 26	30.028	28.5	88.3	W	6	6	10	Cloudy.	0.00
Sunday 27	29.929	26.0	83.3	N	8	8	19	Fair.	0.22
Monday.............28	30.174	18.5	84.7	N	12	13	12	Lt. Snow.	0.04
Tuesday.............29	30.294	25.7	78.3	S E	14	14	13	Cloudy.	0.00
Wednesday 30	30.120	31.0	78.0	E	18	14	21	Cloudy.	0.00
Thursday 31	29.868	30.0	100.0	E	24	24	26	Hy. Snow.	0.83
Monthly Means......	30.025	26.18	83.37	......	......	......	......	....	......

Highest Barometer.............30.616—(7th)
Lowest Barometer..............29.651—(10th)
Monthly range of Barometer... .965
Highest Temperature........... 46 °—(19th)
Lowest Temperature............ 8 °—(7th)
Monthly range of temperature.. 54 °
Greatest daily range of " 27 °—(4th)
Least daily range of " 3 ° -(21st)
Mean of Maxium Temperatures.31.10 °
Mean of Minimum " 19.32 °
Mean dail range of " 11.78 °
Total rainfall or melted snow... 1.80 inches.
Depth of unmelted snow lying on ground at end of month...... 9 inches.
Prevailing wind................. Northwest.
Total movement of wind....... 7.829 miles.
Maximum velocity of wind and direction.......................27 miles from N. E. (31st)
Number of foggy days......... none
Number of clear days........... 3
Number of fair days............. 17
Number of cloudy days on which rain or snow fell.............. 5
Number of cloudy days on which no rain or snow fell 6
Total number of days cn which rain or snow fell............... 16
Dates of Auroras............... 0
Dates of Solar Halos........... 0
Dates of Lunar Halos...........6th, 11th, 14th
Dates of Frost.................. 0
Dates of Polar Bands.......... 0

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of February, 1878. Furnished foe the use of the Board of Health.

FELRUARY.	Barometer, Daily Mean.	Thermometer, Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of Weather.	Rain.
Day and Date.					7 a. m.	2 p. m.	9 a. m.		Inches.
Friday............ 1	30.064	33.7	83.0	N E	24	17	20	Cloudy.	0.10
Saturday..,....... 2	30.361	27.5	81.0	E	17	14	4	Fair.	0.00
Sunday............ 3	30.257	24.5	79.7	S W	4	5	8	Clear.	0.00
Monday........... 4	29.974	25.2	76.0	S W	6	10	6	Clear.	0.00
Tueday........... 5	29.857	34.0	79.0	S	8	8	13	Fair.	0.00
Wednesday....... 6	29.840	41.0	75.0	S W	12	14	12	Clear.	0.00
Thursday......... 7	29.767	40.5	70 3	S W	8	6	8	Hazy.	0.00
Friday............ 8	29.698	33.2	79 3	N E	28	32	32	Cloudy.	0.03
Saturday 9	29.755	25.2	91.7	N E	28	26	28	Lt. Snow.	0.45
Sunday...........10	29.870	23.5	74.0	N	20	26	6	Cloudy.	0.05
Monday...........11	29.934	25.0	69.7	W	6	16	12	Clear.	0.00
Tuesday 12	29.796	29.7	82.0	N E	6	9	3	Cloudy.	0.07
Wednesday.......13	29.929	33.7	72.3	E	13	12	13	Fair.	0.00
Thursday.........14	29.909	32.0	79 0	E	16	8	9	Cloudy.	0.00
Friday 15	29.942	34.0	79.3	E	7	5	3	Cloudy.	0.01
Saturday..........16	29.892	36.5	91.0	S	4	6	9	Hy. Rain.	0.35
Sunday............17	30.109	30.0	85.3	N	17	18	8	Cloudy.	0.09
Monday...........18	30.206	29.7	78.3	S E	7	6	7	Fair.	0.00
Tuesday..........19	29.682	36.2	79 7	S	16	22	5	Cloudy.	0.00
Wednesday....... 20	29.692	37.7	87.3	N E	0	7	7	Clear.	0.00
Thursday.........21	29.467	37.4	100.0	N E	15	23	22	Lt. Rain.	1.76
Friday............22	29.639	35.5	90.0	N W	16	18	14	Lt. Snow.	0.15
Saturday 23	29.937	35.7	71.0	N W	12	10	2	Cloudy.	0.00
Sunday...........24	30.097	31.0	78.7	N	7	8	6	Cloudy.	0.04
Monday...... 25	30.355	29.2	68.3	N W	8	9	5	Fair.	0.00
Tuesday..........26	30.402	32.5	75.7	S W	5	7	6	Clear.	0.00
Wednesday 27	30.139	37.7	65.7	S W	6	10	6	Clear.	0.00
Thursday.........28	30.093	37.0	83.7	S E	6	13	9	Clear.	0.00
....	......	....	....	......	..	..	..	....	....
....	......	....	....	......	..	..	..	....	....
....	......	....	....	......	..	..	..	....	....
Monthly Means.....	29.954	32.46	79.50	......	......	......	......	....	......

Highest Barometer............	30.487—(26th)
Lowest Barometer.............	29.398—(21st)
Monthly range of Barometer...	1.089
Highest Temperature..........	52 °—(28th)
Lowest Temperature...........	15 °—(3, 11)
Monthly range of temperature..	37 °
Greatest daily range of "	21 °—(3, 27 and 28)
Least daily range of "	2 °—(21st)
Mean of maximum temperatures.	38.04 °
Mean of minimum "	26.82 °
Mean daily range of "	11.22 °
Total rainfall or melted snow...	3.10 inches.
Depth of unmelted snow lying on ground at end of month.......	9 inches.
Prevailing wind.................	Northeast.
Total movement of wind........	7.609 miles.

Maximum velocity of wind and direction......................	37 miles from N. E. (8th)
Number of foggy days..........	0
Number of clear days..........	7
Number of fair days...........	9
Number of cloudy days on which rain or snow fell...............	11
Number of cloudy days on which no rain or snow fell...........	1
Total number of days on which rain or snow fell...............	12
Dates of Auroras..............	0
Dates of Solar Halos...........	0
Dates of Lunar Halos..........	7, 10, 11, 14.
Dates of Frost..................	0
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Sergeant, Signal Scrvice, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of March, 1878. Furnished for the use of the Board of Health.

MARCH. Day and Date.	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind. 7 a. m.	Velocity of Wind. 2 p. m.	Velocity of Wind. 9 p. m.	State of Weather.	Rain. Inches.
Friday............ 1	30.041	39.7	81.7	S E	8	7	17	Cloudy	0.00
Saturday........... 2	29.397	39.2	97.0	S E	8	5	22	Cloudy.	0.75
Sunday............ 3	29.697	34.0	83.0	N	21	17	9	Cloudy.	0.07
Monday............ 4	29.959	36.0	75.7	W	8	10	8	Clear.	0.00
Tuesday........... 5	29.730	47.2	73.3	S W	11	14	14	Clear.	0.00
Wednesday....... 6	29.752	42.7	91.3	S W	7	10	7	Cloudy.	0.07
Thursday......... 7	29.991	44.5	78.3	W	12	4	7	Fair.	0.00
Friday............ 8	29.992	46.5	87.0	S E	12	8	9	Cloudy.	0.46
Saturday.......... 9	30.030	48.2	85.3	S E	10	12	9	Cloudy.	0.04
Sunday............10	29.803	46.2	97.3	S E	7	20	6	Hy. Rain.	0.32
Monday............11	29.946	43.2	84.3	S E	3	7	0	Fair.	0.06
Tuesday 12	29.809	38.2	97.0	N E	9	11	14	Foggy.	0.01
Wednesday.......13	29.813	36.5	91.0	N E	8	7	3	Cloudy.	0.34
Thursday..........14	30.101	38.2	81.7	N W	10	9	4	Clear.	0.03
Friday............15	29 985	46.2	87.0	S W	7	10	13	Threatn'g	0.15
Saturday..........16	29.818	43.2	73.3	N W	15	11	20	Cloudy.	0.02
Sunday............17	30.184	35.5	79.7	N E	17	11	8	Cloudy.	0.00
Monday............18	30.174	39.5	79.0	S W	1	10	10	Cloudy.	0.00
Tuesday...........19	30.143	42.2	78.7	N E	12	5	18	Fair.	0.00
Wednesday........20	30.223	35.7	83.7	S E	8	7	4	Fair.	0.00
Thursday.........21	30.109	38.7	94.3	N E	5	9	0	Lt. Rain.	0.02
Friday.............22	30.080	42.2	86.0	S E	4	12	4	Clear.	0.00
Saturday...........23	29.698	45.5	74.3	W	12	19	26	Hazy.	0.03
Sunday............24	29.940	27.2	64.7	N W	10	19	10	Cloudy.	0.06
Monday...........25	29.940	36.0	62.0	W	6	15	10	Clear.	0.00
Tuesday...........26	29.542	47.0	82.7	S	10	18	5	Smoky.	0.03
Wednesday.......27	29.617	38.0	91.3	N E	12	24	30	Lt. Rain.	0.68
Thursday.........28	29.962	38.0	72.0	N E	28	19	6	Fair.	0.12
Friday.............29	30.189	37.2	74.3	N E	7	13	6	Clear.	0.00
Saturday..........30	29.793	36.2	87.2	N E	27	28	14	Hy. Snow	0.51
Sunday............31	29.928	42.2	85.7	N E	16	11	9	Fair.	0.12
Monthly Means......	29.916	40.35	82.58	......	......	......	......	....	......

Highest Barometer............	30.338—(20th)
Lowest Barometer..............	29.340—(2d)
Monthly range of Barometer...	.998
Highest Temperature..........	70°—(23rd)
Lowest Temperature...........	21°—(25th)
Monthly range of Temperature.	49°
Greatest daily range of "	37°—(23d)
Least daily range of "	5°—(3d)
Mean of Maximum "	46.48°
Mean of Minimum "	34.09°
Mean daily range of "	12.39°
Total rainfall or melted snow...	3.89 inches.
Depth of unmelted snow lying on ground at end of month..	9 inches.
Prevailing wind...............	Northeast.
Total movement of wind.......	8 055 miles.
Maximum velocity of wind and direction......................	36 miles from N. E. (23, 28)
Number of foggy days.........	0
Number of clear days..........	4
Number of fair days............	16
Number of cloudy days on which rain or snow fell..............	8
Number of cloudy days on which no rain or snow fell..........	3
Total number of days on which rain or snow fell..............	18
Dates of Auroras..............	0
Dates of Solar Halos...........	0
Dates of Lunar Halos..........	0
Dates of Frost.................	0
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Seegeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of April. 1878. Furnished for the use of the Board of Health.

APRIL.	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of	Rain.
Day and Date					7 a. m.	2 p. m.	9 p. m.	Weather.	Inches.
Monday 1	29.898	47.0	74.7	S E	1	10	6	Clear.	0.00
Tuesday.......... 2	29.860	42.2	77.3	E	6	7	7	Fair.	0.00
Wednesday....... 3	29.808	42.5	77.7	N	14	21	20	Cloudy.	——
Thursday 4	29.729	47.5	61.0	S	12	6	4	Clear.	0.00
Friday............ 5	29.537	48.2	67.7	S W	10	20	5	Fair.	0.00
Saturday.......... 6	29.762	73.0	70.3	N W	7	10	6	Clear.	0.00
Sunday........... 7	29.912	44.2	80.3	S E	9	8	4	Hazy.	0.01
Monday........... 8	29.632	47.7	80.0	S E	12	10	21	Lig't Rain	0.04
Tuesday.......... 9	29.314	52.7	94.0	S E	17	29	19	L't Rain.	0.92
Wednesday.......10	29.452	47.7	69.7	S W	28	48	26	Fair.	——
Thursday.........11	29.469	52.2	59.0	S W	18	38	12	Clear.	0.00
Friday............12	29.643	52.7	54.3	N W	12	24	7	Clear.	0.00
Satnrday 13	29.846	48.5	64.0	O	3	10	0	Fair.	0.00
Sunday............14	29.873	42.2	94.3	N E	18	18	18	Lt Rain	1.03
Monday............15	29.998	43.5	83.7	N E	16	17	10	Fair.	0.15
Tuesday 16	30.100	44.7	78.7	N E	6	9	11	Clear.	0.00
Wednesday 17	30.017	49.2	80.7	S E	10	12	14	Fair.	0.00
Thursday..........18	29.803	54.5	86.7	S E	11	14	10	Clear.	0.00
Friday.............19	29.705	62.5	82.0	S	11	20	12	Foggy.	0.03
Saturday 20	29.742	60.0	64.3	W	24	30	12	Clear.	0.00
Sunday............21	29.834	48.7	83.0	N	12	14	8	Cloudy.	0.24
Monday............22	29.645	53.0	98.0	S	25	10	16	Hy. Rain.	1.55
Tuesday 23	29.447	58.7	92.3	W	10	7	2	Cloudy.	0.66
Wednesday........24	20.342	51.7	95.3	N W	12	12	16	Lt. Rain.	0.93
Thursday..........25	29.526	52.7	86.3	W	7	10	4	Cloudy.	0.15
Friday 26	29.792	44.0	91.7	N	13	7	4	Cloudy.	0.11
Saturday 27	29.934	47.5	87.3	N	14	18	18	Cloudy.	0.01
Sunday............28	29.974	53.2	76.0	N	16	14	12	Fair.	0.00
Monday 29	29.808	56.7	69.0	E	2	6	5	Clear.	0.00
Tuesday...........30	26.776	63.2	67.0	S W	8	30	12	Fair.	0.00
....	......	....	....	......	......	......	......	....	......
Monthly Means......	29.739	50.06	78.21	......	......	......	......	....	......

Highest Barometer	30.133—(17th)
Lowest Barometer	29.204—(9th)
Monthly range of Barometer	0.929
Highest Temperature	72°—(30th)
Lowest Temperature	35°—(4, 6)
Monthly range of Temperature.	37°
Greatest daily range of "	19°— (4th, 23d & 30th)
Least daily range of "	4°—(27th)
Mean of Maximum "	55.55°
Mean of Minimum "	43.03°
Mean daily range of "	12.47°
Total rainfall or melted snow	5.83 inches.
Depth of unmelted snow lying on ground at end of month	9 inches
Prevailing wind	North.
Total movement of wind	9.308 miles.

Maximum velocity of wind and direction	54 miles from S. W. (10th)
Number of foggy days	0
Number of clear days	7
Number of fair days	13
Number of cloudy days on which rain or snow fell	10
Number of cloudy days on which no rain or snow fell	0
Total number of days on which rain or snow fell	15
Dates of Auroras	0
Dates of Solar Halos	0
Dates of Lunar Halos	0
Dates of Frost	——
Dates of Polar Bands	0

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of May, 1878. Furnished for the use of the Commissioner of Health.

MAY.	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of	Rain.
Day and Date					7 a. m.	2 p. m.	9 p. m.	Weather.	Inches.
Wednesday 1	29.868	50.2	81.7	N	3	10	16	Lig't Rain	0.64
Thursday 2	29.544	54.7	89.0	N W	3	18	4	Cloudy.	0.50
Friday............ 3	29.731	48.0	64.0	W	12	17	17	Fair.	0.00
Saturday 4	29.689	48.0	74.7	S W	8	16	11	Hy. Rain.	0.22
Sunday........... 5	29.777	51.2	75.3	S W	8	13	4	Cloudy.	0.00
Monday.... 6	29.664	56.0	74.3	S E	8	14	12	Cloudy.	0.03
Tuesday........... 7	29.729	56.0	68.7	E	12	7	4	Cloudy.	0.00
Wednesday....... 8	29.759	56.5	68.0	W	6	18	14	Clear.	0.26
Thursday.......... 9	29.941	49.2	62.3	W	17	26	11	Clear.	0.00
Friday.... 10	30.048	47.2	70.3	N W	16	16	3	Fair.	0.00
Saturday 11	30.111	45.5	76.7	S E	13	9	4	Cloudy.	0.00
Sunday............12	30.073	47.5	61.7	N W	6	18	7	Fair.	0.00
Monday.... 13	30.102	47.7	67.7	E	2	14	4	Fair.	0.00
Tuesday 14	30.042	48.5	71.0	E	5	7	3	Cloudy.	0.00
Wednesday 15	29.996	53.2	66.7	S E	5	20	5	Fair.	0.00
Thursday...........16	29.916	54.7	72.0	S W	4	11	4	Hazy.	0.00
Friday 17	30.037	49.2	76.3	N E	7	14	15	Clear.	0.00
Saturday 18	29.860	50.2	86.0	E	26	13	14	Cloudy.	0.07
Sunday............19	29.565	59.5	89.7	S	9	10	8	Cloudy.	0.72
Monday............20	29.785	59.7	77.3	W	24	22	13	L't Rain.	0.32
Tuesday 21	30.215	48.2	85.0	N	11	10	2	Clear	0.00
Wednesday.........22	33.139	50.2	81.0	E	6	9	4	Clear.	0.00
Thursday...........23	29.749	59.0	91.0	S E	18	22	6	Threat'n'g	1.13
Friday 24	29.787	69.0	61.7	S W	14	26	20	Clear.	0.00
Saturday 25	29.725	64.2	61.7	W	15	21	11	Clear.	0.00
Sunday............26	29.701	58.5	69.0	W	17	20	12	Clear.	0.00
Monday ... .27	29.895	53.5	78.0	E	9	7	1	Fair.	0.00
Tuesday...........28	30.054	51.2	81.7	E	6	10	6	Cloudy.	0.01
Wednesday.........29	29.994	48.5	97.7	N E	14	25	13	Hy. Rain.	1.06
Thursday......... 30	30.148	51.7	80.0	N E	11	11	10	Clear.	0.00
Friday.............31	30.116	58.0	81.7	S E	15	15	6	Fair.	0.00
Monthly Means.	29.895	53.05	75.55	......	......	......	......	....	......

Highest Barometer.............	30.247 – (21,22)
Lowest Barometer	29.438 – (2d)
Monthly range of Barometer...	0.809
Highest Temperature..........	78 ° – (24th)
Lowest Temperature..........	39 ° – (12,13)
Monthly range of Temperature	39 °
Greatest daily range of "	24.5 ° – (19th)
Least daily range of "	7 ° – (27th, 28th)
Mean of Maximum "	59.31 °
Mean of Minimum "	46.71 °
Mean daily range of "	12.60 °
Total rainfall or melted snow...	4.96 inches.
Depth of unmelted snow lying on ground at end of month......	0 inches
Prevailing wind..................	West.
Total movement of wind.......	8.393 miles.

Maximum velocity of wind and direction.......................	48 miles from S.-S.W. (23d)
Number of foggy days..........	0
Number of clear days..........	8
Number of fair days............	11
Number of cloudy days on which rain or snow fell.......	12
Number of cloudy days on which no rain or snow fell...........	0
Total number of days on which rain or snow fell.............	14
Dates of Auroras..............	0
Dates of Solar Halos..........	0
Dates of Lunar Halos..........	13th, 15th
Dates of Frost.................	—
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis, during the Month of June 1878. Furnished for the use of the Commissioner of Health.

JUNE. Day and Date.	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of Weather.	Rain.
					7 a. m.	2 p. m.	9 p. m		Inches.
Saturday.......... 1	29.948	62.7	81.0	S	11	8	10	Lt. Rain.	0.32
Sunday............ 2	29.876	60.2	90.7	S E	22	24	14	Cloudy.	0.23
Monday........... 3	29.647	68.0	70.3	S W	12	30	19	Fair.	0.00
Tuesday.......... 4	30.035	58.7	70.0	N E	16	7	5	Clear.	0.00
Wednesday....... 5	30.191	57.2	73.3	E	6	10	6	Hazy.	0.00
Thursday......... 6	29.944	59.7	80.0	S	10	12	2	Lt Rain.	1.15
Friday..... 7	29.762	51.0	97.7	N	0	20	16	Lt. Rain.	0.34
Saturday.......... 8	29.738	49.7	88.3	N E	12	14	4	Cloudy.	0.53
Sunday........... 9	29.748	55.0	64.7	N E	10	9	5	Fair.	0.00
Monday...........10	29.849	54.0	78.0	N E	5	12	3	Clear.	0.11
Tuesday 11	29.920	56.7	76.3	N W	10	9	4	Fair.	0.00
Wednesday.......12	30.078	57.2	69.3	N E	8	8	2	Clear.	0.00
Thursday..........13	30.189	59.5	67.3	N E	7	7	10	Clear.	0.00
Friday............14	30.078	61.0	76.7	E	9	7	4	Fair.	0.00
Saturday..........15	29.744	72.0	79.7	S W	6	17	8	Fair.	0.07
Sunday............16	29 841	63.5	78.3	E	0	8	1	Clear.	0.00
Monday............17	30.014	59.0	70.7	N E	11	12	6	Clear.	0.00
Tuesday......... 18	29 994	62.2	71.7	S E	8	8	4	Clear.	0.00
Wednesday........19	29.839	66.0	75.7	S E	4	13	7	Cloudy.	0.00
Thursday.........20	29.583	61.7	85.0	W	12	23	20	Fair.	0.13
Friday............21	29.783	54.0	82.3	N	22	12	7	Cloudy.	0.29
Saturday..........22	29.909	58.5	64.3	N	18	11	2	Clear.	0.00
Sunday.......... 23	29.920	65.0	66.3	E	10	7	8	Clear.	0.00
Monday. 24	29.960	68.2	68.3	S E	8	8	4	Clear.	0.00
Tuesday...........25	29.819	71.2	70.0	S W	6	19	11	Fair.	0.01
Wednesday.......26	29.876	69.7	77.0	W	20	22	8	Threatn'g	0.00
Thursday.........27	30.047	69.2	78.0	E	5	12	6	Clear.	0.00
Friday............28	30.030	69.2	78.3	E	4	12	4	Clear.	0.00
Saturday..........29	29.962	71.5	88.3	S E	5	3	8	Cloudy.	0.70
Sunday 30	29.872	75.2	84.7	S	8	21	8	Fair.	0.00
....	......	....	....	......	..	..	..	....	....
Monthly Means......	29.906	62.22	76.87	......	......	......	......	....	......

Highest Barometer............	30.230—(5th)
Lowest Barometer.............	29.510—(20th)
Monthly range of Barometer...	.720
Highest Temperature..........	83 °—(25th)
Lowest Temperature...........	45 °—(11th)
Monthly range of Temperature.	38 °
Greatest daily range of "	24 °—(23d)
Least daily range of "	5 °—(8th)
Mean of Maximum "	69.10 °
Mean of Minimum "	55.48 °
Mean daily range of "	13.62 °
Total rainfall or melted snow...	4.88 inches.
Depth of unmelted snow lying on ground at end of month..	0 inches.
Prevailing wind.......	Northeast.
Total movement of wind.......	69 44 miles.
Maximum velocity of wind and direction....................	36 miles South (2d), Southwest, (3d).
Number of foggy days....	0
Number of clear days..........	10
Number of fair days...........	9
Number of cloudy days on which rain or snow fell..............	8
Number of cloudy days on which no rain or snow fell...........	10
Total number of days on which rain or snow fell..............	1
Dates of Auroras	13
Dates of Solar Halos...........	6th, 9th, 11th
Dates of Lunar Halos..........	0
Dates of Frost.................	0
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of July, 1878. Furnished for the use of the Commissioner of Health.

JULY. Day and Date	Barometer, Daily Mean.	Thermometer, Daily Mean	Relative Humidity, Daily Mean.	Direction of Wind	Velocity of Wind.			State of Weather.	Rain.
					7 a. m.	2 p. m	9 p. m.		Inches.
Monday........... 1	30.000	64.5	87.0	N	7	20	8	Cloudy.	0.65
Tuesday.......... 2	30.104	63.0	72.3	N	12	16	12	Clear.	0.00
Wednesday....... 3	30.120	64.5	78.3	N	12	14	8	Clear.	0.00
Thursday.......... 4	30.129	66.5	74.3	N	2	10	5	Cloudy.	0.00
Friday............ 5	30.068	70.7	73.7	N E	6	5	3	Clear	0.00
Saturday.......... 6	29.993	72.0	75.7	E	4	7	0	Clear.	0.00
Sunday............ 7	29.834	75.5	75.3	Calm.	0	17	0	Clear.	0.27
Monday........... 8	29.847	76.7	78.7	W	8	8	4	Fair.	0.48
Tuesday 9	29.910	71.2	78.3	N W	4	16	2	Fair.	0.17
Wednesday.......10	30.059	70.0	80.3	N	7	10	9	Lt. Rain	0.94
Thursday.. 11	30.046	68.2	95.0	Calm	4	0	6	Lt Rain.	0.41
Friday.............12	29.998	68.5	96.7	N E	9	11	8	Hy. Rain.	0.00
Saturday...........13	30.025	74.5	86.0	E	8	4	4	Clear.	0.00
Sunday............14	29.922	80.7	84.0	S E	9	10	0	Fair.	0.00
Monday...........15	29.843	82.2	75.7	S W	1	10	6	Fair.	0.00
Tuesday...........16	29.796	88.0	71.0	S W	8	15	2	Clear	0.00
Wednesday........17	29.760	87.2	67.7	S W	12	12	9	Fair.	0.00
Thursday..........18	29.894	73.2	74.3	N	10	13	6	Clear.	0.00
Friday.............19	29.927	76.7	73.7	Calm	0	9	0	Cloudy.	0.00
Saturday..........20	29.854	79.7	76.7	E	0	6	11	Fair.	0.00
Sunday............21	30.001	69.5	77.0	N E	12	11	0	Clear.	0.00
Monday...........22	30.106	67.5	65.3	N	9	11	3	Hazy.	0.00
Tuesday.......... 23	30.115	69.5	68.7	N W	2	12	4	Fair.	0.00
Wednesday........24	29.956	73.5	66.0	Calm	0	16	4	Clear.	0.00
Thursday 25	29.692	71.2	83.7	S W	10	14	11	Cloudy.	0.01
Friday.............26	29.646	69.0	86.3	E	17	12	0	Cloudy.	0.01
Saturday. 27	29.968	69.5	78.0	E	4	13	9	Clear.	0.00
Sunday............28	30.021	71.0	75.7	Calm	0	21	4	Cloudy.	0.00
Monday...........29	29.876	72.0	80.3	S E	12	16	15	Fair.	0.00
Tuesday...........30	29.859	70.7	81.0	S E	8	12	6	Cloudy.	—
Wednesday........31	29.769	78.2	58.0	W	12	28	6	Clear.	0.00
Monthly Means......	29.940	72.75	77.25	......	......	......	......	....	......

Highest Barometer............	30.170—(4th)
Lowest Barometer.............	29.526—(26th)
Monthly range of Barometer...	.644
Highest Temperature....	95°—(16,17)
Lowest Temperature...........	56°—(12th)
Monthly range of temperature..	39°
Greatest daily range of "	20°—(18,24)
Least daily range of "	4°—(25th)
Mean of Maxium Temperatures.	79.23°
Mean of Minimum "	65.98°
Mean daily range of "	13.25°
Total rainfall or melted snow...	2.94 inches.
Depth of unmelted snow lying on ground at end of month......	0 inches.
Prevailing wind...............	North.
Total movement of wind.......	60.26 miles.
Maximum velocity of wind and direction.....................	28 miles west. (31st)
Number of foggy days.........	0
Number of clear days..........	9
Number of fair days...........	16
Number of cloudy days on which rain or snow fell......	5
Number of cloudy days on which no rain or snow fell	1
Total number of days on which rain or snow fell..............	8
Dates of Auroras	15th
Dates of Solar Halos...........	0
Dates of Lunar Halos..........	0
Dates of Frost.................	0
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Sergeant, Signal Service. U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of August, 1878. Furnished for the use of the Commissioner of Health.

AUGUST. Day and Date.	Barometer, Daily Mean.	Thermometer, Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind. 7 a. m.	Velocity of Wind. 2 p. m.	Velocity of Wind. 9 a m.	State of Weather.	Rain. Inches.
Thursday......... 1	29.793	77.0	56.0	W	12	22	12	Fair.	0.00
Friday............ 2	29.795	76.2	67.7	S E	9	12	6	Clear.	0.00
Saturday..,....... 3	29.782	75.7	67.3	W	3	14	9	Fair.	0.00
Sunday........... 4	29.783	76.0	75.7	E	6	13	6	Fair.	0.02
Monday........... 5	29.712	79.7	57.7	W	6	12	18	Fair.	——
Tueday........... 6	29.837	72.7	77.3	E	10	9	5	Clear.	0.00
Wednesday....... 7	29.815	77.2	74.3	S W	9	9	4	Fair.	0.00
Thursday.. 8	29.673	79.0	71.7	S W	8	14	20	Fair.	0.00
Friday............ 9	29.753	73.2	64.7	N W	12	14	8	Clear.	0.00
Saturday 10	29.821	72.5	61.0	N W	4	19	8	Fair.	0.00
Sunday 11	29.961	71.2	63.7	E	5	10	7	Fair.	0.00
Monday............12	29.893	69.5	71.7	S E	4	18	6	Fair.	0.00
Tuesday 13	29.750	67.5	73.3	S E	9	15	20	Lt. Rain.	0.30
Wednesday 14	29.703	71.2	67.7	W	12	16	8	Clear.	0.22
Thursday....,....15	29.885	69.2	64.3	W	12	16	8	Clear.	0.01
Friday 16	30.034	66.5	64.0	W	6	13	5	Clear.	0.00
Saturday....... ..17	30.023	68.5	73.0	S E	6	14	5	Clear.	——
Sunday...........18	29.885	70.7	86.7	S E	16	7	3	Cloudy.	0.00
Monday 19	29.853	73.2	81.0	E	4	8	4	Cloudy.	0.00
Tuesday 20	29.903	70.5	77.0	N E	9	14	8	Fair.	0.00
Wednesday....... 21	29.998	70.2	78.7	Calm	0	10	6	Clear.	0.00
Thursday ... .22	29.998	71.2	79.7	S E	4	18	5	Clear.	0.00
Friday.... 23	29.855	77.5	75.0	S	10	21	11	Cloudy.	0.07
Saturday 24	29.854	71.2	89.0	N	6	7	20	Cloudy.	0.02
Sunday............25	30.004	64.7	70.3	E	12	11	4	Clear.	——
Monday...... 26	29.864	67.2	66.0	W	8	16	5	Fair.	0.00
Tuesday 27	29.762	71.2	69.3	S	8	10	9	Clear.	0.00
Wednesday 28	29.916	66.5	79.3	N E	9	18	8	Fair.	0.00
Thursday 29	30.077	66.7	78.3	E	8	9	1	Foggy.	0.00
Friday............30	30.003	67.5	77.7	E	6	8	1	Hazy.	0.00
Saturday.. 31	30.916	69.5	79.7	Calm	0	8	5	Clear.	0.00
Monthly Means.....	29.867	71.1	79.00	......	......	......	......	....	......

Highest Barometer............	30.088—(29th)
Lowest Barometer.	29.624—(8th)
Monthly range of Barometer...	0.464
Highest Temperature..........	88 °—(5th)
Lowest Temperature.	56 ° (16,26,30)
Monthly range of temperature..	32 °
Greatest daily range of "	23 °—(13th)
Least daily range of "	5 °— (18th and 20th)
Mean of maximum temperatures.	79.00 °
Mean of minimum "	63.04 °
Mean daily range of "	15.06 °
Total rainfall or melted snow...	0.64 inches.
Depth of unmelted snow lying on ground at end of month.......	9 inches.
Prevailing wind................	S. W.
Total movement of wind.... ...	69.43 miles.

Maximum velocity of wind and direction......................	42 miles from N. W. (13th)
Number of foggy days..........	0
Number of clear days..........	10
Number of fair days...........	17
Number of cloudy days on which rain or snow fell...............	2
Number of cloudy days on which no rain or snow fell...........	2
Total number of days on which rain or snow fell..............	9
Dates of Auroras..............	0
Dates of Solar Halos...........	0
Dates of Lunar Halos.........	0
Dates of Frost.................	0
Dates of Polar Bands..........	0

SAMUEL W. RHODE,

Sergeant. Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of September, 1878. Furnished for the use of the Commissioner of Health.

SEPTEMBER. Day and Date	Barometer, Daily Mean.	Thermometer, Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind. 7 a. m.	 2 p. m.	 9 a m.	State of Weather.	Rain. Inches.
Sunday 1	29.897	75.7	67 3	S W	8	12	8	Clear.	0.00
Monday 2	29.899	69.0	72 0	W	12	13	5	Clear.	[illegible]
Tueday 3	30.029	66 0	84 0	N	6	8	6	Cloudy.	0.00
Wednesday 4	30.016	66.5	78.7	E	8	11	4	Clear.	0.00
Thursday 5	29.973	73.7	75 7	W	6	13	11	Foggy.	0.00
Friday 6	30.027	74.5	77.3	S	2	17	7	Fair.	0.00
Saturday 7	29.994	74.0	77 7	S E	6	14	9	Fair.	0.00
Sunday 8	29.958	75.5	78 3	S W	4	17	11	Fair.	—
Monday 9	29.888	67.7	84.0	S	8	4	14	Lt. Rain.	0.41
Tuesday 10	30.132	56.5	56.0	N W	14	16	18	Clear.	0.00
Wednesday 11	30.264	53.5	62.3	N W	8	10	9	Fair.	0.00
Thursday 12	30.170	53 7	63.3	N	14	20	10	Cloudy.	0.05
Friday 13	30.008	52.7	64.7	N W	15	14	3	Cloudy.	0.00
Saturday 14	30.137	59.7	49 0	N	14	10	4	Clear.	0.00
Sunday 15	30.094	64.0	64.3	S	8	30	12	Clear.	0.00
Monday 16	29.914	72.5	60.3	S W	15	28	11	Cloudy.	0.00
Tuesday 17	29.935	70.5	65.3	S W	13	27	3	Fair.	0.00
Wednesday 18	29.984	66.7	84.0	E	3	10	9	Clear.	0.00
Thursday 19	29.705	68.0	86 0	W	[illegible]	23	14	Th'r St'm.	1.43
Friday 20	29.773	53.0	82.0	N W	12	[illegible]	10	Cloudy.	0.03
Saturday 21	30.110	51.5	52.7	N	15	17	6	Clear.	0.00
Sunday 22	30.103	62.0	62.0	S	8	18	21	Clear.	0.00
Monday 23	29.975	59.7	74 7	W	19	29	18	Lt. Rain.	0.31
Tuesday 24	30.088	57.2	78.0	S E	9	13	12	Fair.	0.01
Wednesday 25	29.815	60.5	82 0	S	26	18	24	Lt. Rain,	1.35
Thursday 26	30.400	50.7	70.3	N E	20	6	4	Clear.	0.00
Friday 27	30.375	53.5	71.3	E	2	10	11	Fair.	0.00
Saturday 28	30.057	57.2	81.3	S E	11	12	3	Cloudy.	0.00
Sunday 29	29.897	61.0	88.0	S E	6	14	16	Foggy.	0.40
Monday 30	29.674	74.0	74.3	S	16	24	20	Clear.	0.01
Monthly Means	30.010	63.4	72.2	......	......	......	......	....	......

Highest Barometer	30.527—(27th)
Lowest Barometer	29.505—(20th)
Monthly range of Barometer	1.022
Highest Temperature	86°—(1st)
Lowest Temperature	43.5°—(21st)
Monthly range of temperature	43.5°
Greatest daily range of "	24°—(14th)
Least daily range of "	8°—(28th)
Mean of maximum temperatures	70.7°
Mean of minimum "	55.3°
Mean daily range of "	15.4°
Total rainfall or melted snow	4.03 inches
Depth of unmelted snow lying on ground at end of month	9 inches.
Prevailing wind	N. W. and S. E.
Total movement of wind	85.27 miles.

Maximum velocity of wind and direction	30 miles from S. E. (29th)
Number of foggy days	0
Number of clear days	7
Number of fair days	15
Number of cloudy days on which rain or snow fell	5
Number of cloudy days on which no rain or snow fell	3
Total number of days on which rain or snow fell	10
Dates of Auroras	0
Dates of Solar Halos	0
Dates of Lunar Halos	8th
Dates of Frost	0
Dates of Polar Bands	0

SAMUEL W. RHODE,

Sergeant. Signal Scrvice, U S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis, during the Month of October, 1878. Furnished for the use of the Commissioner of Health.

OCTOBER. Day and Date.	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind	Velocity of Wind. 7 a. m.	2 p. m.	9 p. m.	State of Weather.	Rain. Inches.
Tuesday 1	29.583	68.5	78.7	S	15	29	18	Cloudy	0.67
Wednesday 2	29.854	64.5	56.0	S W	15	32	12	Clear.	0.00
Thursday 3	30.016	58.7	53.0	W	16	16	12	Clear.	0.00
Friday.............. 4	30.130	56.5	59.3	W	8	16	6	Fair.	0.00
Saturday........... 5	30.119	52.2	51.7	W	9	17	9	Clear.	0.00
Sunday........ ... 6	30.027	55.5	48.7	S W	12	21	19	Cloudy.	0.00
Monday............ 7	29.934	55.2	65.0	S W	12	19	6	Cloudy.	0.03
Tuesday 8	29.640	60.7	73.7	S	10	9	25	Th'r St'm.	0.48
Wednesday 9	30.051	52.5	60.7	N W	19	13	4	Fair.	0.00
Thursday............10	29.904	55.2	72.3	S E	4	16	20	Cloudy.	—
Friday...............11	30.029	52.7	54.7	N W	11	19	10	Clear.	0.08
Saturday.............12	30.041	56.2	55.7	S W	14	18	11	Clear.	0.00
Sunday...............13	29.852	55.5	69.0	S W	28	16	9	Lt. Rain.	0.02
Monday....... ...14	29.639	67.0	76.3	S W	9	19	23	Threat'ng	0.08
Tuesday 15	29.739	54.5	91.3	N E	20	14	18	Lt Rain	0.94
Wednesday.........16	29 498	60.0	78.3	S	24	21	25	Cloudy.	1.25
Thursday 17	29.778	42 7	62.3	S W	20	28	17	Cloudy	—
Friday...............18	30 127	39.2	67.7	N W	21	18	10	Fair.	0.00
Saturday.. 19	30.041	43.0	73.3	S E	7	12	9	Clear.	0.00
Sunday.. ...20	29.741	56.5	56.7	S	12	21	18	Clear.	0.00
Monday. 21	29.788	50.7	69.7	S E	8	20	17	Lt. Rain.	0.05
Tuesday..............22	29.986	38.2	66.3	W	18	13	4	Cloudy.	0.02
Wednesday 23	29.899	42.5	65.3	W	3	8	10	Cloudy.	0.00
Thursday............24	30.189	43.5	64.7	N E	6	10	11	Cloudy.	0.00
Friday................25	30.230	44.7	74.0	W	7	14	7	Cloudy.	0.05
Saturday..............26	30.293	35.5	80.7	N W	9	10	14	Lt. Snow.	0.01
Sunday 27	30.308	29.2	81.3	W	10	16	8	H'y. Snow	0.10
Monday..............28	30.039	35.7	66.0	S	8	20	14	Cloudy.	0.00
Tuesday..............29	29.788	45.0	61 0	S W	10	15	6	Cloudy.	—
Wednesday..........30	29.782	37.5	83.3	N W	5	26	18	Threatn'g	0.36
Thursday.............31	30.200	29.7	70.7	N W	18	15	10	Fair.	0.00
Monthly Means.	29.943	49.3	67.3	......	......	......	......	....	......

Highest Barometer........	30.400—(28th)
Lowest Barometer.............	29.411—(16th)
Monthly range of Barometer...	0.989
Highest Temperature..	77 °—(1st)
Lowest Temperature............	22 °—(28th)
Monthly range of Temperature.	55 °
Greatest daily range of "	23 °—(16th)
Least daily range of "	7 °—(24th)
Mean of Maximum "	57.8 °
Mean of Minimum "	42.1 °
Mean daily range of "	15.7 °
Total rainfall or melted snow..	4.13 inches.
Depth of unmelted snow lying on ground at end of month..	0 inches.
Prevailing wind.......	Southwest.
Total movement of wind.......	10,150 miles.
Maximum velocity of wind and direction.....................	48 miles Southwest, (1st), & S. (16th).

Number of foggy days....	0
Number of clear days..........	5,
Number of fair days...........	14
Number of cloudy days on which rain or snow fell...............	10
Number of cloudy days on which no rain or snow fell...........	2
Total number of days on which rain or snow fell..............	18
Dates of Auroras	0
Dates of Solar Halos...........	29th
Dates of Lunar Halos..........	0
Dates of Frost..................	19th—First of the season.

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of November, 1878. Furnished for the use of the Commissioner of Health.

NOVEMBER. Day and Date	Barometer, Daily Mean.	Thermometer Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind. 7 a. m.	2 p. m.	9 p. m.	State of Weather.	Rain. Inches.
Friday 1	29.813	45.7	53.7	S W	14	16	6	Clear.	0.00
Saturday 2	30.246	40.0	67.7	N	14	16	4	Fair.	0.00
Sunday 3	30.353	41.7	62.3	W	9	13	8	Cloudy.	0.00
Monday 4	30.366	40.7	59.7	N E	15	9	8	Fair.	0.00
Tuesday 5	29.972	47.0	74.3	S	11	16	8	Clear.	0.06
Wednesday 6	29.984	42.5	79.7	N	4	16	16	Lt. Snow.	0.04
Thursday 7	30.113	36.5	66.3	N W	12	19	12	Clear.	0.00
Friday 8	30.140	38.5	73.7	N	11	7	9	Cloudy.	0.00
Satnrday 9	30.117	44.5	68.7	S W	8	12	6	Fair.	0.00
Sunday 10	29.789	47.7	71.0	S W	5	12	10	Lig't Rain	—
Monday 11	29.616	44.0	83.7	N W	4	16	16	Foggy.	0.14
Tuesday 12	29.649	46.2	62.7	W	16	21	23	Fair.	0.00
Wednesday 13	30.164	37.7	61.3	W	10	14	8	Clear.	0.00
Thursday 14	30.351	41.2	71.7	E	4	3	4	Fair	0.00
Friday 15	30.129	46.0	71.3	S E	2	6	16	Clear.	0.00
Saturday 16	30.027	45.5	92.0	N E	17	9	12.	Lt. Rain.	0.29
Sunday 17	30.027	47.2	85.0	W	9	10	4	Cloudy.	—
Monday 18	29.947	46.0	81.7	S W	9	10	14	Cloudy.	0.00
Tuesday 19	29.742	41.7	83.0	N	6	8	8	Foggy.	0.00
Wednesday 20	29.649	42.7	76.0	S	4	4	25	Hy. Rain.	0.36
Thursday 21	29.867	38.0	79.0	N	15	16	5	Cloudy.	0.07
Friday 22	29.773	38.2	67.3	N W	5	5	10	Fair.	0.00
Saturday 23	29.760	39.2	70.0	E	6	4	15	Clear.	0.00
Sunday 24	29.915	39.5	74.0	N	15	8	10	Cloudy.	—
Monday 25	30.170	33.7	73.3	N W	15	9	6	L't. Snow.	0.05
Tuesday 26	30.136	36.2	72.7	S W	6	8	6	Cloudy.	0.00
Wednesday 27	29.699	33.2	76.0	N	7	16	18	Cloudy.	—
Thursday 28	29.956	36.7	65.7	W	11	16	15	Clear.	0.00
Friday 29	30.197	35.0	71.3	W	10	18	6	Clear.	0.00
Saturday 30	30.350	37.0	69.0	N E	10	11	13	Fair.	0.00
Monthly Means.	30.006	41.0	72.1	......	......	......	......	....	......

Highest Barometer............30.423—(3d)
Lowest Barometer ....29.537—(11th)
Monthly range of Barometer... 0.886
Highest Temperature.......... 53 °— (6th, 9th, 12th)
Lowest Temperature.......... 25 °—(26th,)
Monthly range of Temperature 28 °
Greatest daily range of " 21.5 °—(9th)
Least daily range of " 6 °—(25th)
Mean of Maximum " 46.7 °
Mean of Minimum " 34 °
Mean daily range of " 12.7 °
Total rainfall or melted snow... 1.01 inches.
Depth of unmelted snow lying on ground at end of month...... 0 inches
Prevailing wind................ N. W., W.
Total movement of wind....... 7.578 miles.

Maximum velocity of wind and direction....................27 miles from N. W. (11th)
Number of foggy days.......... 2
Number of clear days.......... 8
Number of fair days........... 15
Number of cloudy days on which rain or snow fell........... 9
Number of cloudy days on which no rain or snow fell........... 2
Total number of days on which rain or snow fell.............. 11
Dates of Auroras............... 0
Dates of Solar Halos.......... 0
Dates of Lunar Halos.......... 0
Dates of Frost.................3, 5, 9, 12, 13, 14, 15, 20, 22, 23, 26, 27, 29 and 30.

SAMUEL W. RHODE,
Sergeant, Signal Service, U. S. A.

METEOROLOGICAL REPORT.

Observations taken at Signal Office in Milwaukee, Wis., during the Month of December, 1878. Furnished for the use of the Commissioner of Health.

DECEMBER.	Barometer, Daily Mean.	Thermometer, Daily Mean.	Relative Humidity, Daily Mean.	Direction of Wind.	Velocity of Wind.			State of	Rain.
Day and Date.					7 a. m.	2 p. m.	9 p. m.	Weather.	Inches.
Sunday............ 1	29.997	40.0	73.0	N E	20	15	11	Cloudy.	0.00
Monday........... 2	29.699	36.5	74.0	W	12	18	5	Cloudy.	0.60
Tuesday 3	29.419	37.0	84.3	S	4	16	16	Lt. Rain.	0.22
Wednesday 4	29.949	31.5	75.7	N W	21	16	5	Cloudy.	0.04
Thursday.. 5	29.981	31.7	85.7	N W	10	15	16	Cloudy.	0.00
Friday............. 6	30.087	27.0	73.3	N W	10	16	16	Cloudy.	0.00
Saturday.......... 7	30.251	25.5	75.7	N W	10	7	1	Cloudy.	0.00
Sunday 8	29.894	34.2	83.3	E	24	17	17	Lt Snow.	0.08
Monday........... 9	29.620	32.7	85.7	N W	10	11	18	Cloudy.	0.05
Tuesday...........10	29.530	32.0	75.7	N W	16	16	9	Cloudy.	0.00
Wednesday.......11	29.979	25.2	71.7	N W	8	17	14	Clear.	0.00
Thursday..........12	30.464	24.0	79.0	W	11	16	7	Clear.	0.00
Friday.............13	30.400	24.0	82.0	N W	4	9	10	Lt. Snow.	0.06
Saturday...........14	30.053	28.0	88.7	N	23	15	16	Hy. Snow.	0.48
Sunday............15	30.067	23.7	73.7	N W	12	11	7	Cloudy.	——
Monday............16	30.192	22.0	76.3	N W	8	3	4	Smoky.	——
Tuesday.......... 17	30.120	22.2	83.0	W	2	8	12	Lt. Snow.	0.02
Wednesday........18	30.370	14.5	77.3	N W	10	16	6	Lt. Snow.	——
Thursday 19	30.523	10.7	71.7	Calm	0	17	9	Clear	——
Friday..............20	30.185	25.0	73.7	S W	8	10	7	Lt. Snow.	0.01
Saturday. 21	29.652	22.7	86.3	N W	9	13	14	Lt. Snow.	0.09
Sunday.............22	29.796	9.5	73.3	W	20	20	20	Cloudy.	0.03
Monday.............23	30.033	3.2	67.3	W	16	22	29	Fair.	0.00
Tuesday.............24	30.118	3.2	73.0	W	26	34	19	Fair.	0.00
Wednesday 25	30.092	9.7	66.7	W	12	17	15	Clear.	0.00
Thursday 26	29.929	9.5	79.0	W	12	12	10	Lt. Snow.	——
Friday...............27	30.080	11.7	81.0	W	14	14	10	Fair.	——
Saturday.......... 28	30.189	12.2	63.3	S W	8	13	16	Clear.	0.00
Sunday.............29	30.080	21.7	77.3	S W	5	8	10	Lt Snow.	——
Mneday'...........30	30.267	7.0	72.7	W	19	16	9	Clear.	0.00
Tuesday...........31	30.200	19.5	80.0	S W	10	11	11	Lt. Snow.	——
Monthly Means......	30.039	21.6	76.9	......	......	......	......	....	......

Highest Barometer.............30.577—(19th)
Lowest Barometer.............29.347—(3d)
Monthly range of Barometer... 1.230
Highest Temperature.......... 44 °—(3d)
Lowest Temperature........... 03 °—(24th)
Monthly range of temperature.. 52 °
Greatest daily range of " 29.0 °—(20th)
Least daily range of " 3 ° -(1st)
Mean of Maxium Temperatures. 27.9 °
Mean of Minimum " 15.1 °
Mean daily range of " 12.9 °
Total rainfall or melted snow... 1.08 inches.
Depth of unmelted snow lying on ground at end of month...... 0 inches.
Prevailing wind................. West.
Total movement of wind....... 98.58 miles.
Maximum velocity of wind and direction ....45 miles west. (24th)
Number of foggy days......... 0
Number of clear days.......... 3
Number of fair days........... 10
Number of cloudy days on which rain or snow fell.............. 13
Number of cloudy days on which no rain or snow fell 5
Total number of days on which rain or snow fell.............. 18
Dates of Auroras.............. 0
Dates of Solar Halos........... 0
Dates of Lunar Halos........... 29th
Dates of Frost................ 0
Dates of Polar Bands........... 0

SAMUEL W. RHODE,

Sergeant, Signal Service, U. S. A.

ANNUAL METEOROLOGICAL SUMMARY.

1878.	BAROMETER.			THERMOMETER.			Mean Relative Humidity.	PRECIPITATION.		WIND.		
	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.		Total amount of Rainfall or melted Snow, inches.	No of days on which rain or snow fell.	Prevailing Direction.	Highest Velocity.	Total Movement for the Month.
January	30.616	29.651	30.025	46	−8	26.2	83.4	1.80	16	N W	27	7829
February	30.487	29.398	29.954	52	15	32.5	79.5	3.10	12	N E	37	7609
March	30.338	29.340	29.916	70	21	40.3	82.6	3.89	18	N E	56	8055
April	30.133	29.204	29.739	72	35	50.1	78.2	5.83	15	N	54	9308
May	30.247	29.438	29.895	78	39	53.	75.5	4.96	14	W	48	8393
June	30.230	29.510	29.906	83	45	62.2	76.9	4.88	13	N E	36	6944
July	30.170	29.526	29.940	95	56	72.7	77.2	2.94	8	N	28	6026
August	30.088	29.624	29.867	88	56	71.1	72.2	0.64	9	S W	42	6943
September	30.527	29.505	30.010	86	42.5	63.4	72.2	4.03	10	N W and S E	39	8527
October	30.400	29.411	29.943	77	22	49.3	67.3	4.13	18	S W	48	10150
November	30.423	29.537	30.006	53	25	41.	72.1	1.01	11	W and N W	27	7578
December	30.577	29.347	30.039	44	−8	21.6	76.9	1.08	18	W	45	9858
Annual Means	30.353	29.458	29.937	70.3	28.4	48.6	76.2	3.19	13.5	....	38.9	8101.7

ALPHABETICAL SUMMARY

Of Nuisances declared, Inspections made, Orders issued and Business transacted by the Health Office during the year 1878.

Alleys, number declared public nuisances, 85.

Bids, invited for collection of Garbage, Offal, etc., May 20.
    Invited for collection of Garbage, Offal, etc., Sept. 14.

Circular, issued to Principal, of Schools, May 25.
    Owners of property abutting on ravine south of Spring Street between Thirteenth and Fourteenth Streets, May 27.
    Owners of property abutting on ravine south of Spring Street between Thirteenth and Fourteenth Streets, June. 5.
    Rail Road Companies, concering privies, June 1.
    Undertakers, concerning disinfecting of bodies, June 6.
    Packers in Menomonee Valley, requesting them to report facilities for slaughtering for butchers and terms, June 8.
    The people, in relation to Scarlet Fever, June 11.
    Midwives, concerning registration, June 14.
    Physicians, in relation to Reports of Scarlatina, Diphtheria and Small-pox cases, June 17.
    Undertakers, concerning use of ice, Sept. 3.
    The People, concerning deposition of Garbage, Oct. 1.
    The People, concerning Diptheria, Oct. 9.
    Undertakers and Cemetery Associations, concerning Burial Permits, Dec. 2.
    Physicians, concerning reports of deaths within 24 hours, Dec. 2.
    R. R. companies, concerning transportation of bodies to Milwaukee infected with contagious diseases, Dec. 14.
    Clergymen, Undertakers and others, forbidding public funerals in cases of contagious disease, Dec. 14.

Collection of $102.00 from U. S. Government paid over to City Treasurer, November 7th.

Commissioner's inspections of miscellaneous matters, 124.
Orders, number of special, 71.
Permits to Plumbers, 4.
Shippers of Merchandize to Yellow Fever District and to persons visiting said District, 12.
References, to Board of Public Works, 51.
Chief of Fire Department, 1.
Chief of Police Department, 7.
City Attorney, 3.
County Board of Supervisors, 1.
The Mayor, 1.
Superintendent of House of Correction, 3.
Poor, 13.
Ward foremen, 5.

Reports to Common Council on Resolutions referred to him, 11.

Complaints, entered and acted on, 1415.

Condemnations, made by Meat Inspector, 49.
Contract for collection of Garbage, offal and dead animals in the entire city, let to J. Herman & Co., September 30th, for 1 year.

Cisterns, insecure, report about, 3.

Dangerous building reported to Board of Public Works, Sept. 4.
torn down by order of Commissioner, July 9.

Dead Animals, reported removed by contractor, 253.

Death certificates, recorded, 2008.

Examinations, made by Health Inspector, 519.
Meat Inspector, 1462.

Fines, imposed by Commissioner on Garbage and Offal Contractors, $48.
In Municipal Court for violation of Health Ordinances, $65.

Garbage, Collectors of, Notices to, 16.
Loads of, collected, 1834,
At a cost of $2126.50 or $1.16 a load.

Houses, disinfected, 230.
placarded, 301.

Hospital, Passavant, Patients cared for at City Expense, 15.
Deaths at, 3.

Hotels, Inspections of, 3.

Inspections by Commissioner, All the alleys in Ninth Ward.
Asylum Little Sisters of the Poor.
Bethel Home.
Caswell Block, corner Third and Chestnut. Sts.
District School Buildings in the City.
German and English Academy privies.
Hog-Pens in First Ward, numbering 74.
Jail.
Morgue.
Meiner's Distillery.
Merrick & Co's., tallow factory.
Layton & Co's., packing house.
Plankinton & Armour's, packing house.
Peter McGeogh's, packing house.
Slaughter house of J. Hermann & Co., and their factory in Town of Lake.
Ravine, south of Spring Street, Fourth Ward.
School lot, corner Brown and Twentieth Streets, Ninth Ward.
Urinals in basement of Old City Hall.

Limits, established for keeping of hogs, Aug. 19.
Cutting of ice, Nov. 12.

Midwives, number of registered, 23.

Nuisance lots reported to Common Council, 93.
Number of reported to Board of Public Works, 125.
Privies on Public School lots, 17.
From which have been removed 618½ yards.

Milwaukee and Menomonee Rivers declared nuisance, Aug. 24.

Order, to Board of Public Works, to have school privies cleaned within ten days, Aug. 13.
To cause human bones exhumed in laying water pipes on Thirteenth Street, reburied, Nov. 20.

Ordinances passed, prohibiting rendering of dead animals, Jan. 7.
The leaving of wells and cisterns open and unguarded, Aug. 5.
The keeping of swine, Aug. 19.
The sale of impure milk, Aug. 19.
Providing for removal of Garbage, Offal and Dead Animals, Sept. 2.
Penalties for violation of ordinances passed since April 20, 1875.

Permits, for burial issued, 1970.
Cleaning privies issued, 564.
Police, aid of requested in 3 cases.
Circulars distributed by, 25,000.
Privies, contents of cleaned measuring 2971 yards.
Public School Building in Ninth Ward declared inadequate in size, May 10.
Privies of, declared nuisances, June 22.
Recovery, certificates of issued, 271.
Reports of Health Inspector filed since May 1, 219.
Meat Inspector filed since Oct. 1, 65.
Transactions, to Council, 15.
To Press, weekly, of deaths, 52.
Rules, for Night Scavengers, issued Aug. 31.
Garbage collectors, issued Oct. 1.
Disinfectors, issued Oct. 28.
Scavengers, No. of liscensed, registered, 9.
Suspended, 1, Dec. 17.
Sick Cases recorded: Small Pox, 86.
Diphtheria, 389.
Scarlatina, 127.
Streets, declared public nuisances, 9.
Suits, commenced in Municipal Court, 16.
Trials in the Nuisance Court over 1000.
Vaccinations, made by order of the Commissioners, 123.
Water and wells, report about condition of, to Council, July 8.

RECAPITULATION BY WARDS.

WARDS.	Death rates by Wards to total population of 123,600.	Approximate population of Wards calculated from death rate.	CONTAGIOUS DISEASES.						Houses Disinfected.	Still births.	Accidents resulting in Death.	Certificates of death recorded.	No. of Privy Vaults cleaned.	Yards of night soil removed.	Loads of Garbage Removed.	Condemnations by Meat Inspector.	Reference for abatement of Nuisances.		Complaints entered and acted on.
			Small Pox.		Diphtheria.		Scarlatina.												
			Sick.	Deaths	Sick.	Deaths.	Sick.	Deaths.									To Common Council.	To Board of Public Works.	
First	7.8	9,641	10	2	11	3	8	..	6	19	5	157	54	169	304	5	5	3	197
Second	16.-	19,776	31	6	57	20	12	3	46	21	9	301	90	457	334	9	13	18	194
Third	4.9	6,056	2	..	4	1	6	..	7	10	4	99	36	149	265	..	10	5	102
Fourth	8.5	10,506	4	..	35	9	26	2	28	14	7	166	76	335	389	5	4	2	177
Fifth	8.1	10,012	2	..	43	12	7	1	16	6	8	150	70	365	36	3	8	7	165
Sixth	8.6	10,630	3	1	38	9	11	4	20	13	3	167	27	155	138	5	4	8	78
Seventh	4.8	5,933	4	..	6	..	7	2	6	7	4	90	97	475	195	1	..	9	128
Eighth	5.9	7,292	6	..	49	10	14	..	23	12	5	117	33	176	43	3	13	11	83
Ninth	10.5	12,978	13	2	36	8	8	3	23	13	5	199	43	204	27	9	1	44	77
Tenth	8.4	10,382	7	..	22	5	15	3	27	22	..	172	10	109	31	4	3	3	52
Eleventh	8.3	10,259	..	..	44	14	9	5	16	17	5	165	16	212	30	2	9	7	79
Twelfth	4.7	5,809	1	..	24	5	1	..	8	6	3	90	7	87	25	1	5	5	31
Thirteenth	3.5	4.326	..	1	5	2	2	2	4	10	2	72	5	78	17	2	18	3	20
At large	....	....	3	1	15	5	1	1	..	..	8	63	..	..	..	..	..	..	32
Totals	100.0	123,600	86	13	389	103	127	26	230	170	68	2008	564	2971	1834	49	93	125	1415

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